Paper 56

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

POLICE S. REDDY, SURESH K. TIKOO,
and LORNE A. BABIUK
Junior Party
(U.S. Patent No. 6,492,343),

v.

MICHAEL A. JOHNSON, JEFFREY M. HAMMOND,
RICHARD J. McCOY and MICHAEL G. SHEPPARD
Senior Party
(U.S. Application No. 09/485,512).

Patent Interference No. 105,358
(Technology Center 1600)(MPT)

JUDGMENT - Bd. R. 127(b)

Before: LANE, MEDLEY and TIERNEY, Administrative Patent Judges.

TIERNEY, Administrative Patent Judge.

As discussed in the Order to Show Cause (Paper No. 50), VectoGen Pty Ltd ("VectoGen") is now the owner of the involved Reddy patent and the involved Johnson application. The Order to Show Cause was issued as the United States Patent & Trademark Office does not normally maintain interferences between commonly owned patents or

applications. Bd. R. 206. In response to the Order to Show Cause, VectoGen has filed a request for adverse judgment against Junior Party Reddy as to Counts 1 and 2, the only counts in interference. (Reddy Request for Adverse Judgment, Paper No. 54).

During the course of this interference, Reddy filed three substantive motions. Reddy Motion 1 moves to attack Johnson's accorded priority benefit date. (Paper No. 29). Reddy Motion 2 alleges that all of Johnson's involved claims are unpatentable under 35 U.S.C. § 112, first paragraph for failing to provide a sufficient written description and/or failing to enable a person skilled in the art to make and use the claimed subject matter. (Paper No. 30). Reddy Motion 3 alleges that Johnson's involved claims are unpatentable under 35 U.S.C. § 112, second paragraph as the claims are indefinite. Additionally, in response to Reddy Motions 2 and 3, Johnson filed a responsive motion, Johnson Motion 2,[1] which requests that Johnson's claims be amended in response to Reddy Motions 2 and 3. (Paper No. 55).

Counsel for VectoGen, i.e., representing both Reddy and Johnson, specifically requests that Reddy's three motions and Johnson's Motion 2 be withdrawn from consideration. No Johnson oppositions to the three Reddy motions have been received by the Board. Similarly, no opposition to Johnson's responsive motion has been received by the Board. Thus, the issues raised in Reddy and Johnson's pending motions are not fully developed.

Reddy Motion 1, which attacks Johnson's accorded benefit date, is ***dismissed*** as moot in light of Reddy's request that adverse judgment be entered against Reddy. Further, based upon the facts presented in this interference, including the fact that Johnson's involved claims are

[1]While the motion is titled Johnson Responsive Motion 1, this is the second Johnson motion filed in the interference. Per the Standing Order (Paper No. 2), ¶ 121.1, each motion of a party is to be numbered consecutively. Thus, Johnson's responsive motion is referred to as "Johnson Motion 2."

present in a pending U.S. application, a determination as to the patentability of Johnson's claims is best resolved by an examiner outside the course of this interference. Accordingly, we exercise our discretion and recommend that the examiner of Johnson's involved U.S. Application No. 09/485,512 review the issues raised in Reddy Motions 2 and 3, and recommend that the examiner enter any rejection deemed necessary. Bd. R. 127(c) and *In re Sullivan*, 362 F.3d 1324, 1327, 70 USPQ2d 1145, 1148 (Fed. Cir. 2004).

Johnson Motion 2 seeks to amend Johnson's involved claims in response to Reddy Motions 2 and 3. As we do not reach the merits of Reddy Motions 2 and 3, Johnson Motion 2 is ***dismissed*** as moot.[2]

It is:

ORDERED that judgment on priority of invention as to Counts 1 and 2, the only counts in interference, is awarded against Junior Party Reddy.

FURTHER ORDERED that Junior Party Reddy is not entitled to a patent containing claims 13-14, 16-19, 21-28, 30-40 and 43-44 of Reddy, U.S. Patent No. 6,492,343, all of which correspond to Count 1.

FURTHER ORDERED that Junior Party Reddy is not entitled to a patent containing claims 13-14, 16-19, 22-28, 31-40 and 43-44 of Reddy, U.S. Patent No. 6,492,343, all of which correspond to Count 2.

[2]Additionally, we note that Johnson Motion 2 does not identify where Johnson received authorization from the Board to file this particular responsive motion and a brief review of the record failed to reveal such authorization. As Johnson Motion 2 is dismissed as moot, we need not consider whether or not the filing of this particular motion was authorized by the Board.

FURTHER ORDERED that Reddy Motion 1 (Paper No. 29), attacking Johnson's accorded priority benefit date, is ***dismissed*** as moot.

RECOMMENDED that the examiner of Johnson's involved application review Reddy Motions 2 and 3 (Paper Nos. 30 and 31) and make any rejections deemed necessary to ensure the patentability of Johnson's claims.

FURTHER ORDERED that Johnson Motion 2, which seeks to amend Johnson's claims in response to Reddy Motions 2 and 3, is ***dismissed*** as moot.

FURTHER ORDERED that a copy of this paper shall be made of record in the files of U.S. Application No. 09/485,512 and U.S. Patent No. 6,492,343.

FURTHER ORDERED that a copy of Reddy Motion 2, Reddy Motion 3 and Johnson Motion 2 shall be made of record in the files of U.S. Application No. 09/485,512.

FURTHER ORDERED that the parties attention is directed to the settlement agreement provisions in 35 U.S.C. § 135(c) and 37 C.F.R. § 41.205.

/Sally Gardner Lane/
SALLY GARDNER LANE
ADMINISTRATIVE PATENT JUDGE

/Sally C. Medley/
SALLY C. MEDLEY
ADMINISTRATIVE PATENT JUDGE

/Michael P. Tierney/
MICHAEL P. TIERNEY
ADMINISTRATIVE PATENT JUDGE

) BOARD OF PATENT
) APPEALS AND
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Paper No. 3/3/06

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES
(Administrative Patent Judge Michael P. Tierney)

POLICE S. **REDDY**, SURESH K. TIKOO, and
LORNE A. BABIUK,
(U.S. Patent 6,492,343)
Junior Party,

v.

MICHAEL A. **JOHNSON**, JEFFREY M. HAMMOND,
RICHARD J. McCOY and MICHAEL G. SHEPPARD
(U.S. Application 09/485,512)
Senior Party.

Patent Interference No. **105,358**
(Technology Center 1600)

REDDY SUBSTANTIVE MOTION 3
(for Judgment Pursuant to 37 C.F.R. § 41.121(a)(I)(iii)
on the ground of Indefiniteness under 35 U.S.C. § 112, second paragraph)

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REDDY SUBSTANTIVE MOTION 3
(for Judgment Pursuant to 37 C.F.R. § 41.121(a)(I)(iii) on the ground of Indefiniteness under 35 U.S.C. § 112, second paragraph).

I. REQUEST FOR RELIEF

Junior party REDDY, *et al.* ("Reddy") moves under 37 C.F.R. § 41.121(a)(I)(iii) for judgment against Senior Party JOHNSON, *et al.* ("Johnson") on all of Johnson's claims in interference because they do not distinctly claim the subject matter of the invention as required under Paragraph 2 of 35 U.S.C. § 112.

II. REASONS FOR RELIEF REQUESTED

A. Background

The technology at issue in this interference relates to recombinant viruses that are engineered to be useful as vaccines. The particular viruses involved are porcine adenoviruses. An adenovirus is a DNA virus that infects the respiratory tract, intestines, and other mucous membranes. Fact ¶ 29.

For nearly 20 years, scientists have recognized adenoviruses as having the potential to be recombined with foreign genes encoding antigens of more virulent pathogens for the purpose of creating vaccines. Fact ¶¶ 30, 31. Since 1987, researchers have studied the potential use of adenoviruses as vectors for the delivery and expression of foreign DNA. Fact ¶ 30. One of the challenges that such scientists face is to insert the foreign genes (or "heterologous DNA") in such a way that the adenovirus retains the ability to replicate. Fact ¶ 48. If the foreign genes are inserted into a location that codes for polypeptides that are essential to viral replication, then the resulting adenovirus is "replication-defective." Fact ¶ 49. Replication-defective adenoviruses cannot be grown except in a complementing "helper" cell-line that can produce the essential products of

the deleted region or regions of the adenovirus. Fact ¶¶ 50-51. In the absence of a complementing cell-line, viral DNA that has been recombined to eliminate or disable one or more essential genes will not express a virus. Fact ¶ 50. Such recombinants are therefore known as "helper-dependent" recombinants. Fact ¶ 52.

By experimentation it is sometimes possible to identify certain areas of the adenovirus genome that are not essential for viral replication. Fact ¶ 53. In order to understand which regions of a given adenovirus are needed for replication, it is important to understand the life cycle of the adenovirus. Transcription of adenovirus DNA is accomplished in two phases: the early phase and the late phase. Fact ¶ 35. During the early phase, the virus selectively transcribes certain "early genes" that perform a variety of functions to create the necessary pre-conditions for viral replication. Fact ¶ 36. The adenovirus early genes are identified by number E1 through E4. Fact ¶ 37.

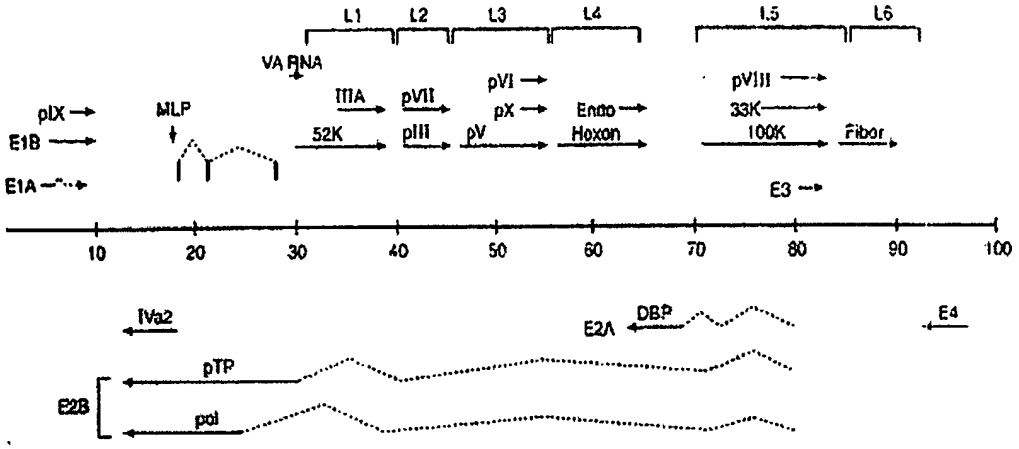
Once early-phase transcription is complete, transcription of the "late genes" may begin. Fact ¶ 38. The products of late genes include capsid proteins which are critical structural elements required for the virus to survive. Fact ¶¶ 32, 39. By convention, adenovirus proteins are identified by Roman numerals, however the major capsid proteins are also known by other names such as "fiber" for pIV, "hexon" for pII, and "penton" for pIII. Fact ¶¶ 33, 34. Structural proteins, such as the pVIII protein, are products of late-phase transcription. Fact ¶ 45. Some early genes also encode polypeptides that are essential for viral replication. Fact ¶ 46. For instance, in human adenoviruses, E1 is essential for replication. Fact ¶ 52. Other early regions may be dispensable when the virus is to be grown in a cell culture in a laboratory. Fact ¶ 47.

Viral DNA is transcribed in blocks known as transcription units, which can be processed into multiple mRNAs. Fact ¶ 40. A single mRNA may consist of one or more "open reading frames," each of which can be translated into a protein. Fact ¶ 41. The open reading frame for one gene or protein may overlap with the open reading frame for another. Fact ¶ 42. As a result, the same sequence of nucleotides may form part of more than one gene and thus, more than one gene may be affected when a given sequence of nucleotides is deleted or recombined. Fact ¶ 43. The arrangement of genes or "open reading frames" on a viral genome is commonly illustrated in a "genome map."

Adenoviruses have an upper limit to the amount of genetic information they can hold. Fact ¶ 55. For this reason, scientists working with recombinant adenoviruses are concerned with identifying ways to delete native DNA sequences in order to make room for foreign DNA sequences of interest. Fact ¶ 56. One way that this is accomplished is by identifying genes that encode for products that are non-essential in viral replication Fact ¶¶ 53, 54. As is discussed below, this is the approach that Johnson used.

More difficult, but potentially more advantageous, is the approach of developing complementary cell lines that are customized to provide the elements that the virus needs to replicate. When such "helper" cell lines are available, the genes associated with the elements that the helper can produce are rendered superfluous for replication, and may be deleted to make room for foreign genes of interest. Fact ¶¶ 50, 51. If helper cell lines are available, it is possible to delete genes that are needed to make the virus replication-competent. Fact ¶¶ 56, 58. Deletions of native adenovirus DNA may prevent the expression of any genes that are associated with the deleted nucleotides. Fact ¶ 57.

All of Johnson's claims in interference contain limitations directed to insertion of heterologous DNA within certain map unit ranges of PAV3. Fact ¶ 1. A genome is "mapped" by dividing the whole genome into 100 units. Fact ¶ 4. In 1998 Reddy published a "genome map" of PAV3 that lays out the elements of PAV3 on such a scale, which is reproduced below. Fact ¶ 27. (Ex. 2029, Reddy (1998), at page 416, Figure 1).



The arrows represent genes or groups of genes that are transcribed in PAV3. Fact ¶ 27. The bodies of the arrows show where the transcribed nucleotides are located, and the arrow heads identify the termination point of the genes. Fact ¶ 27. As shown above, the E3 region begins after map unit 80. The illustration above shows, for example, that nucleotides encoding the E3 genes also encode the pVIII protein associated with late regions (specifically, the L5 region, in PAV3). Fact ¶ 28. The Reddy paper was published in 1998. Fact ¶ 27.

Because map units are defined in relation to the total size of the genome, the specific nucleotide to which a given map unit refers depends on the size of the genome.

Fact ¶ 5. For example, unit 81 refers to the 810th nucleotide in a genome of 1000 nucleotides (81*10 = 810), and to the 4,050th nucleotide in a genome of 5000 nucleotides (81*50 = 4,050). Fact ¶ 5.

B. The Disclosures of the '512 Application

The '512 Application (Ex. 2002) simultaneously discloses three *different* sizes for the PAV3 genome: 34.8 kb, 35kb and 34.094 kb. Fact ¶ 8. Johnson's Australian priority application describes the size of the PAV3 genome as being 34.8 kb (Ex. 2003). Fact ¶ 24. The reference to 35kb genome size for PAV3 appears for the first time in the original PCT patent application (Ex. 2004) at Figure 1. Fact ¶ 25. Johnson added the reference to 34.094 kb genome size for PAV3 when he added Figure 15 to his PCT application through an amendment submitted November 11, 1999, to the International Preliminary Examining Authority ("IPEA") (Ex. 2034).[1] Fact ¶ 26. The '512 Application nowhere defines which of these three sizes is to be used as the basis for the map unit ranges set

[1] This is a substantive amendment and is new matter. Accordingly, Johnson's amendment violates WIPO Patent Cooperation Treaty Rule 34(2)(b), which states, "The applicant shall have a right to amend the claims, the description, and the drawings, in the prescribed manner and within the prescribed time limit, before the international preliminary examination report is established. The amendment shall not go beyond the disclosure in the international application as filed." Since the genome size of 34.094 kb was not known in the art until Reddy's 1998 publication, this addition was clearly new matter.

forth in the claims. Fact ¶ 9. Current research demonstrates that the correct size of the PAV3 genome is 34.094 kb. Fact ¶ 11.

C. Legal Standard for Proving Indefiniteness

A claim is invalid as indefinite "[i]f the scope of the invention sought to be patented is unclear from the language of the claim[.]" *In re Wiggins*, 488 F.2d 538, 541, 179 U.S.P.Q. 421, 423 (CCPA 1973). Whether a claim is indefinite is a question of law. *Union Pac. Res. Co. v. Chesapeake Energy Corp.*, 236 F.3d 684, 692, 57 U.S.P.Q.2d 1293, 1297 (Fed. Cir. 2001). It turns on whether "those skilled in the art would understand the scope of the claim when the claim is read in light of the rest of the specification." *Id.*; *Ex parte Tanksley*, 37 U.S.P.Q.2d 1382, 1387, *16 (BPAI 1994). The primary purpose of the definiteness requirement is to give to the public notice as to what constitutes infringement, so that one reading the patent knows "what may or may not be manufactured." *Norton Co. v. Bendix Corp.*, 449 F.2d 553, 557, 171 U.S.P.Q. 449, 451 (2nd Cir. 1971); *United Carbon Co. v. Binney Smith Co.*, 317 U.S. 228, 232, 236 (1942). Although the degree of precision necessary for definiteness "is a function of the nature of the subject matter[,]" *Mossman v. Broderbund Software, Inc.*, 51 U.S.P.Q.2d 1752, 1757 (E.D. Mich. 1999), "an invention must be capable of accurate definition, and it must be accurately defined, to be patentable." *United Carbon Co.*, 317 U.S. at 237. Finally, if the meaning of a claim is in doubt, especially if there is close prior art, the claim must be declared invalid. *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1218, 18 U.S.P.Q.2d 1016, 1031 (Fed. Cir. 1991).

D. Johnson's Claims in Interference are Indefinite

For the purposes of this motion, Johnson claim 1 is illustrative. Fact ¶ 2. It reads:

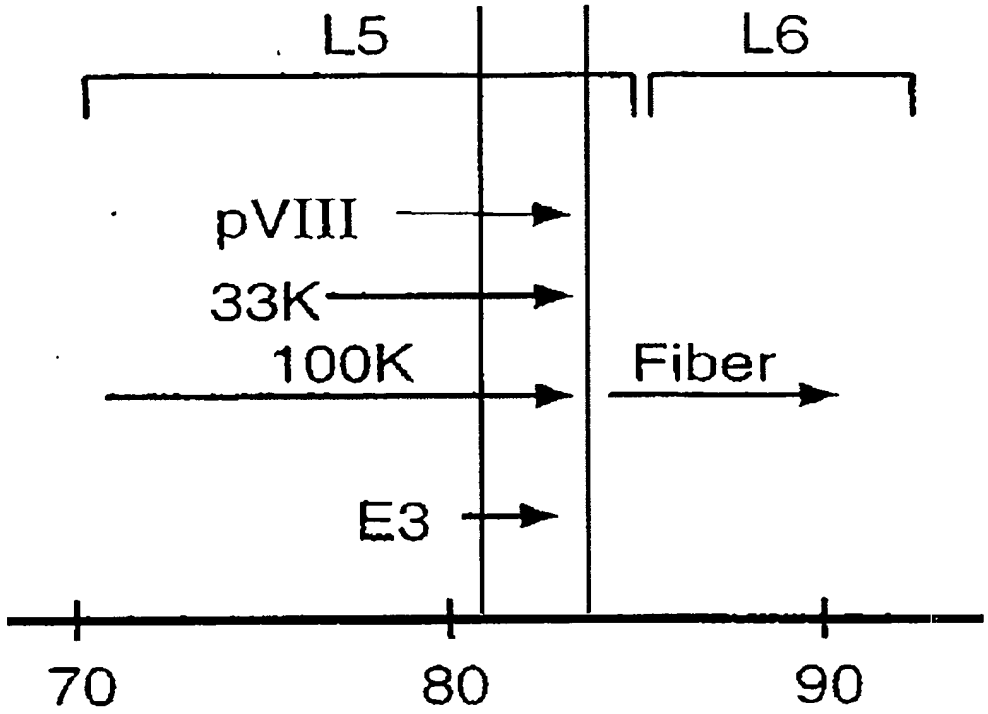
> A recombinant porcine adenovirus expressing heterologous DNA, said DNA of interest being stably integrated into a site of said recombinant porcine adenovirus genome wherein said site is selected from the group consisting of one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84, and 97-99.5 of PAV3.

In sum, this claim is directed to a porcine adenovirus incorporating heterologous DNA in one or more of a Markush group of map unit limitations. Claim 1 is representative of all of Johnson's claims in interference because they all incorporate one or more map unit limitations. Fact ¶ 3. In order to understand the scope of these claims, a person of skill in the art would first try to determine how the specified map units correspond to the PAV3 genome. Fact ¶ 21. To do that, the first step would be to determine how many nucleotides correspond to a single map unit. Ordinarily, this is a matter of simple math:

Genome Size / 100 = Nucleotides per Map Unit

But in this instance, a person of skill in the art would by stymied from the outset because it would be impossible to determine which of the three genome sizes identified in the specification of the '512 application are intended to be used as the basis for the map units set out in Johnson's claims. Fact ¶ 9. Thus, the use of map units in the claims of the '512 application does not define nucleotide regions of the genome to a person of ordinary skill in the art. Fact ¶ 10.

Claim 30, which is directed to map units 81-84, illustrates the point. Using a map unit scale that is based on the correct size of PAV3 (34.094), map units 81-84 of PAV3 are shown in the following illustration that is based on an excerpt of Reddy's 1988 PAV3 genome map (Fact ¶ 11) (for illustration purposes only, and not drawn precisely to scale):

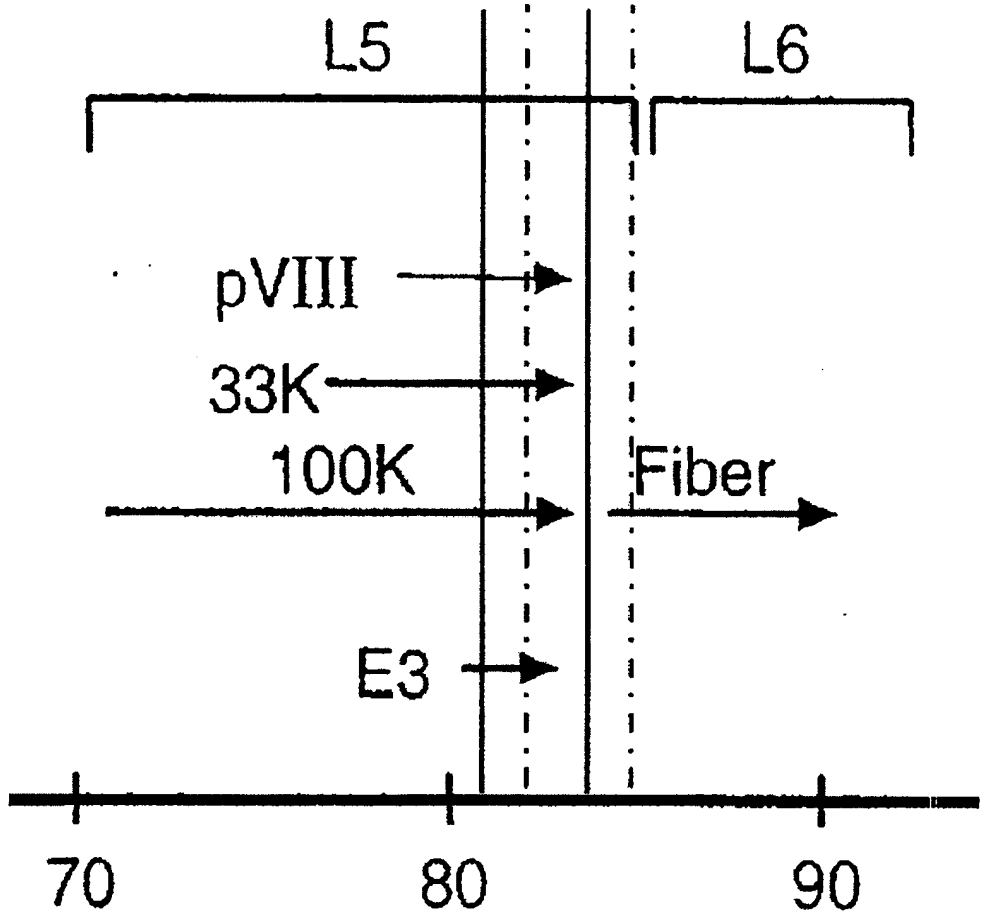


If

The scope of claim 30 might be defined to cover recombinant PAV3 incorporating heterologous DNA anywhere between the solid vertical lines superimposed above.

However, using the 34.8 kb genome size disclosed in the '512 application would yield a different result. Map units 81-84 would then refer to a scale of 348 nucleotides per unit. Fact ¶ 13. Accordingly, map unit 81 would correspond to nucleotide 28,188 (because 81*348=28,188). Fact ¶ 14. Map unit 84 would correspond to nucleotide 29,232 (because 84*348=29,232). Id. However, it is now known that the correct size of PAV3 is 34.094 kb, and each map on the scale above thus corresponds to 340.94 nucleotides. Fact ¶ 15. Accordingly, using the correct map-unit scale, nucleotide 28,188 would correspond to map unit 82.6 (because 28,188/340.94 = 82.6), and nucleotide 29,232 would correspond to map unit 85.73 (because 29,232/304.94 = 85.73). Fact ¶ 16.

The claimed range therefore shifts significantly (again provided for illustration purposes only):



In the diagram shown above, the broken vertical lines depict the nucleotides specified if the genome size is assumed to be 34.8kb. Notably, the range shifts so far as to encompass within it the fiber gene of L6 – a gene that is essential to viral replication.

Fact ¶ 18. The splice acceptor site of the fiber gene begins at nucleotide 28910. Fact ¶ 19.

Because the patent does not call out which of the three genome sizes should be employed when interpreting the map unit ranges of the claims, the scope of claim 30 is indefinite. Fact ¶9. For the same reasons, all of Johnson's other claims in interference are indefinite. All of them purport to be defined in terms of map units which are vague and not consistently defined in the '512 specification (Ex. 2002). Fact ¶¶ 2, 3, 9.

Johnson's claims 28 and 30 are made even *less* definite by Johnson's use of the term "about" to qualify his claims. *See Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d at 1218, 18 U.S.P.Q.2d at 1030 (use of the phrase "at least about 160,000" was indefinite). The use of this phrase blurs the already uncertain lines of Johnson's claims. Taking again the example of claim 30, as shown above the range 81-84 might be read, in light of Johnson's self-contradictory disclosure, to refer to map units 82.6 to 85.73. Fact ¶ 16. If a single additional map unit is added to the range at each end through the use of the phrase "about," that would yield a spread of 80 to 86.73. That equates to a total range of 6.73 map units – more than double the 3 map unit range of the claim as it is written. Claim 28 presents an even stronger case of indefiniteness, since it purports to cover an even narrower range (97-99.5), that would be stretched to an even greater degree by the use of the phrase "about."

As demonstrated above, by broadening the scope of the claims through imprecision, Johnson expands their scope by more than 100% in some cases. This is a material difference in the context of this invention, especially in light of the narrowness of Johnson's enabling disclosure. At best, Johnson's disclosure enables one of skill in the

art to make insertions of foreign DNA at certain specific restriction sites disclosed in the examples of his specification. Fact ¶ 1.

Further, Johnson claims 26, 31 and 32 specify the additional limitation that the heterologous DNA be inserted into a "non-essential region" of the recombinant porcine adenovirus vector. Fact ¶ 59. These claims require that insertions be made in *non-essential* regions of the genome. Johnson does not enable or describe producing a replication-defective virus. Fact ¶ 23. By expanding the scope of his claims by imprecision, Johnson pushes them even further into regions of the genome that are clearly essential for viral replication, such as the Fiber gene. Fact ¶¶ 18-19. This is especially material in the case of claims 26, 31 and 32, where the scope of the invention sought to be patented is unclear from the language of the claim. For example, as shown in the above illustrations the range 81-84 either overlaps, or is tightly bounded by, essential regions of the genome. Fact ¶¶ 18, 28. Johnson should not be permitted to claim by imprecision that which he could not claim expressly.

III. CONCLUSION

Johnson's claims suffer from a fatal flaw: they all refer to "map unit" ranges that are ambiguous at best, given the specification's contradictory guidance as to the size of the PAV3 genome. Reddy respectfully requests that the Board grant this motion and find Johnson's claims indefinite.

Dated: February 24, 2006

Respectfully submitted,

By 

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APPENDIX A (EVIDENCE IN SUPPORT OF THE MOTION)

In support of this motion, Reddy relies on Reddy Exhibit Nos. 2002-2005, 2009, 2013, 2022, 2029, 2033, and 2034:

1. Johnson U.S. Patent Application No. 09/485,512, filed May 5, 2000 (Ex. 2002).
2. Johnson Australian Provisional Patent Application No. PO 8560, filed August 14, 1997 (Ex. 2003).
3. Johnson International Patent Application No. PCT/AU98/00648, filed August 14, 1998 (Ex. 2004).
4. Declaration of Interference – Bd. R. 203(d), Paper No. 1, mailed October 19, 2005 (Ex. 2005).
5. Declaration of Katherine R. Spindler, Ph.D. (Ex. 2009).
6. Johnson Clean Copy of Claims, 9 pages (Ex. 2013).
7. P. Seshidhar Reddy et al., *Sequence Analysis of Putative pVIII, E3 and Fibre Regions of Porcine Adenovirus Type 3,* VIRUS RESEARCH 36, 97-106. (1995) (Ex. 2022).
8. P. Seshidhar Reddy et al., *Nucleotide Sequence and Transcription Map Of Porcine Adenovirus Type 3,* VIROLOGY 251(2):414-426 (1998) (Ex. 2029).
9. Second Declaration of Dr. Jeffrey Michael Hammond Under 37 C.F.R. §1.132, 7 pages, with Response to Office Action mailed on February 27, 2004, 19 pages (Ex. 2033).
10. Amended PCT Patent Application No. PCT/AU98/00648 filed November 11, 1999 (Ex. 2034).

APPENDIX B (STATEMENT OF MATERIAL FACTS)

1. All of the claims of the '512 Application specify that insertions of foreign DNA must be made within certain map unit ranges. (Ex. 2013)

2. Claim 1 of the '512 application (Ex. 2002) is directed to recombinant PAV3 where the insertion site is "selected from the group consisting of one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84, and 97-99.5 of PAV3." (Ex. 2013).

3. All of the claims in interference specify that an insertion is to be made into at least one of these map-unit ranges (Ex. 2005).

4. A genome is "mapped" by dividing the whole genome into 100 units. (Ex. 2009 Spindler Decl. at ¶ 18).

5. The specific point to which a given map unit (for example, 81) refers depends on the size of the genome. Map unit 81 refers to the 810th base in a genome of 1000 base, and to the 4,050th base in a genome of 5000 bases, for example. (Ex. 2009 Spindler Decl. at ¶ 18).

6. Thus, map units are defined relative to the overall size of the genome. (Ex. 2009 Spindler Decl. at ¶ 37).

7. The precise nucleotides corresponding to map units specified in the claims of the '512 application can only be determined on the basis of the genome size. (Ex. 2002; Ex. 2009 Spindler Decl. at ¶ 37).

8. The '512 application discloses three different sizes of the PAV3 genome. These are 34.8 kb (page 3, line 28), 35kb (Fig. 1) and 34,094 bp (Fig. 15) (Ex. 2002; Ex. 2009 Spindler Decl. at ¶ 37).

9. The '512 application does not indicate which of these three sizes of PAV3 is intended to be the basis of the map units specified in the claims. (Ex. 2002; Ex. 2009 Spindler Decl. at ¶ 37).

10. The use of map units in the claims of the '512 application does not teach a defined nucleotide region of the genome to a person of ordinary skill in the art. (Ex. 2002; Ex. 2009 Spindler Decl. at ¶ 37).

11. The correct size of the PAV3 genome is in fact 34,094 bp. (Ex. 2029, Reddy et al., supra entire article, but especially at 414-415; Ex. 2009 Spindler Decl. at ¶ 38).

12. Claim 30 pending in the '512 application is directed to insertions made in the range of map units 81-84. (Ex. 2005; Ex. 2009 Spindler Decl. at ¶ 39).

13. Using the 34.8 kb genome size that Johnson attributed to PAV3 prior to Reddy's publication of the compete PAV3 genome, map units 81-84 would be defined by a scale of 348 nucleotides per map unit. (Ex. 2009 Spindler Decl. at ¶ 39).

14. In a 348 nucleotide per map unit map, map unit 81 corresponds to nucleotide 28,188, and map unit 84 corresponds to nucleotide 29,232. (Ex. 2009 Spindler Decl. at ¶ 39).

15. Based on the correct size of 34,094 bp, disclosed in Fig. 15 of the '512 application, each map unit is 340.94 nucleotides. (Ex. 2002; Ex. 2009 Spindler Decl. at ¶ 40 (*citing* Ex. 2002)).

16. According to this scale, nucleotide 28,188 would correspond to map unit 82.6 and nucleotide 29,232 would correspond to map unit 85.73. (Ex. 2009 Spindler Decl. at ¶ 40).

17. The nucleotides specified by map units "81-84" when the PAV3 genome is considered to be 34.8 kb are actually the nucleotides corresponding to map units 82.68 to 85.73 when the correct PAV3 size is used. (Ex. 2009 Spindler Decl. at ¶ 40).

18. The shift in the domain of the map unit range is sufficient to partly encompass nucleotides associated with the essential fiber gene. (Ex. 2009 Spindler Decl. at ¶ 40).

19. According to Reddy 1998, the splice acceptor site for the fiber gene of L6 begins at nucleotide 28910. (Ex. 2009 Spindler Decl. at ¶ 40 (*citing* Ex. 2029, Reddy, page 415, Table 2).

20. Each of the map unit ranges specified in the claims of the '512 Johnson application would be similarly affected by the selection of the genome size. (Ex. 2002; Ex. 2009 Spindler Decl. at ¶ 41).

21. There is a range of results that a person of skill in the art might obtain when interpreting the scope of the claims in light of the different genome lengths recited in the specification. (Ex. 2009 Spindler Decl. at ¶ 42).

22. It is not clear which genome insertions fall within the scope of the claims, and which do not. (Ex. 2009 Spindler Decl. at ¶ 42).

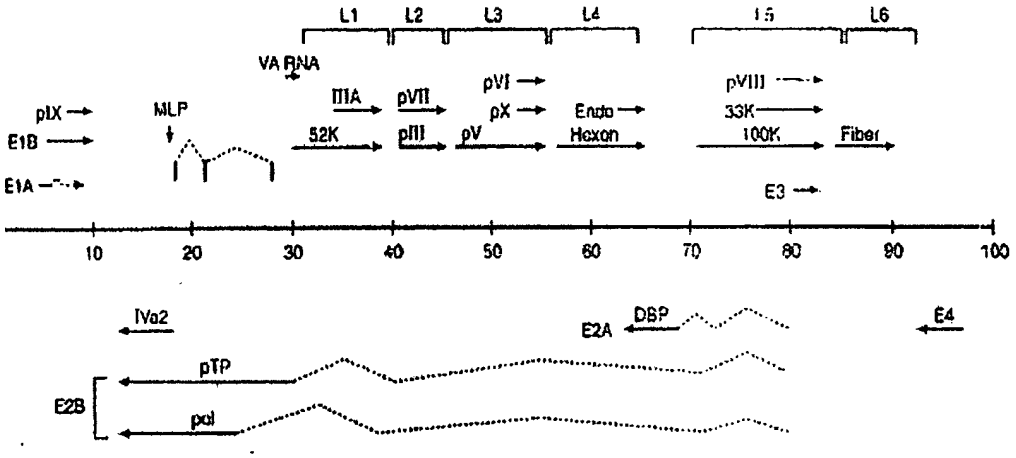
23. The '512 application does not enable or describe producing a replication-defective virus. (Ex. 2002; Ex. 2009 Spindler Decl. at ¶ 59).

24. Johnson's Australian priority application describes the size of the PAV3 genome as being 34.8 kb (Ex. 2003 at page 15, line 11).

25. The reference to 35kb genome size for PAV3 appears for the first time in the original PCT patent application (Ex. 2004, at Figure 1).

26. Johnson added the reference to 34.094 kb genome size for PAV3 when he added Figure 15 to his PCT application through an amendment submitted November 11, 1999, to the International Preliminary Examining Authority ("IPEA") (Ex. 2034; Ex. 2002, Fig. 15).

27. In 1998 Reddy published a "genome map" of PAV3 that lays out the elements of PAV3 on a scale of 100 map units, which is reproduced below. (Ex. 2029, Reddy (1998), at page 416, Figure 1).



The arrows represent genes or groups of genes that are transcribed in PAV3. Above the map unit line are genes that are transcribed left-to-right, and below the line are genes that are transcribed right-to-left.

28. In PAV3, E3 overlaps with the the L5 region which includes the essential gene pVIII. *See* Ex. 2029, Fig. 1; *see also* Exhibit A submitted with Rule 132 declaration of J. Hammond, Feb. 26, 2004, submitted by Johnson during prosecution of the '512 application. (Ex. 2022, Reddy et al., supra at Figures 1 and 2, and page 100; Ex. 2029 Reddy et al., VIROLOGY 251(2):414-426, 420, at Figure 1 reproduced above at paragraph 27 (1998); Ex. 2033; Ex. 2009 Spindler Decl. at ¶ 48)

29. Adenoviruses are DNA viruses that infect the respiratory tract, intestines, and other mucous membranes of a large variety of animals and birds. Known adenoviruses include human ("HAV"), porcine ("PAV"), bovine ("BAV"), mouse ("MAV"), and many others. (Ex. 2014 Thomas Shenk, Ch. 67: Adenoviridae: The Viruses and Their Replication. FIELDS VIROLOGY, 2111-2148 (3rd ed., B.N. Fields et

al. eds. Lippincott – Raven Publishers, Philadelphia (1996); Ex. 2009 Spindler Decl. at 10)

30. Since 1987, researchers have studied the potential use of adenoviruses as vectors for the delivery and expression of foreign DNA. (Ex. 2015 Jean-Luc Imler et al., Trans-Complementation of E1-Deleted Adenovirus: A New Vector To Reduce The Possibility Of Codissemination Of Wild-Type And Recombinant Adenoviruses. HUMAN GENE THERAPY 6, 711-721 (1995); Ex. 2016 Marshall S. Horwitz, Ch. 68: *Adenoviruses,* FIELDS VIROLOGY B. N. Fields B.N. et al. eds. Lippincott – Raven Publishers, Philadelphia, 2149-71, at 2165 (1996); Ex. 2009 Spindler Decl. at ¶ 11)

31. Certain adenoviruses are known to be relatively harmless to the infected immunocompetent human or animal, but highly effective in stimulating an immune response. Scientists realized that a benign adenovirus might be recombined with DNA encoding antigens of more virulent pathogens in order to create a vaccine. (Ex. 2020, T. Tuboly et al., Potential Viral Vectors For The Stimulation Of Mucosal Antibody Responses Against Enteric Viral Antigens In Pigs, research in veterinary science 54, 345-350 (1993); Ex. 2009 Spindler Decl. at ¶ 12)

32. Capsid proteins are critical structural elements that the virus requires to survive. (Ex. 2009 Spindler Decl. at ¶ 14)

33. The proteins that comprise the adenovirus are identified by Roman numerals. Thus, for example, pVIII refers to capsid protein numeral VIII. (Ex. 2009 Spindler Decl. at ¶ 14)

34. The major capsid proteins are also know by other names such "fiber" for pIV, "hexon" for pII, and "penton" for pIII. (Ex. 2014, Shenk et al., supra at 2116, Figure 3; Ex. 2009 Spindler Decl. at ¶ 14)

35. Transcription of adenovirus DNA is accomplished in two phases: the early phase and the late phase. (Ex. 2009 Spindler Decl. at ¶ 15)

36. During the early phase, the virus selectively transcribes certain "early genes" that perform a variety of functions to create the necessary pre-conditions for viral replication. (Ex. 2009 Spindler Decl. at ¶ 15)

37. Early genes are identified by number E1 through E4. (Ex. 2009 Spindler Decl. at ¶ 15)

38. Once early phase transcription is complete, transcription of the "late genes" may begin. (Ex. 2009 Spindler Decl. at ¶ 16)

39. The products of late genes include the capsid proteins. (Ex. 2009 Spindler Decl. at ¶ 16)

40. Viral DNA is transcribed in blocks known as transcription units, which can be processed into multiple mRNAs. (Ex. 2009 Spindler Decl. at ¶ 17)

41. A single mRNA may consist of one or more "open reading frames" each of which can be translated into a protein. (Ex. 2009 Spindler Decl. at ¶ 17)

42. The open reading frame for one gene or protein may overlap with the open reading frame for another. (Ex. 2009 Spindler Decl. at ¶ 17)

43. As a result of overlapping open reading frames in a virus genomic sequence, the same sequence of nucleotides may be part of more than one gene. (Ex. 2009 Spindler Decl. at ¶ 17)

44. In a genome map, each mRNA within each region is represented by an arrow. The body of the arrow represents the nucleotides that are transcribed to produce the mRNA. The direction of the arrow represents the direction of transcription. (Ex. 2009 Spindler Decl. at ¶ 19)

45. The late regions of HAV2 encode structural proteins such as pVIII, which are essential for production of viral particles. (Ex. 2014, Shenk et al., supra at Figures 2B and 3, and 2113-2116, 2118-2120, 2129-2132; Ex. 2009 Spindler Decl. at ¶ 20)

46. The early genes generally encode proteins responsible for replication and transcription of the viral genome, and interactions with the host cell and host immune

response. (Ex. 2014, Shenk et al., supra at Figure 5, and at 2119-2129). (Ex. 2009 Spindler Decl. at ¶ 21)

47. In some circumstances, the products of some early region genes may not be needed for efficient viral growth in cultured cells. (Ex. 2014, Shenk et al., supra at 2134, sentence bridging left and right columns; Ex. 2009 Spindler Decl. at ¶ 21)

48. Scientists have experimented with recombinant techniques to insert foreign DNA into adenoviruses in such a way that the adenovirus retains the ability to replicate because the expression of one or more of the adenovirus's genes may be disrupted depending on where in the genome the foreign genes are inserted. (Ex. 2009 Spindler Decl. at ¶¶ 22, 24)

49. In some cases, the genes that are disrupted may be essential to the formation of the adenovirus rendering the resulting vector "replication-defective.". (Ex. 2009 Spindler Decl. at ¶ 22)

50. In such cases, the adenovirus recombinant cannot form except in the presence of a "helper" cell that is designed to supply the missing protein or proteins that are associated with the disabled gene or genes. (see Ex. 2016, Marshall S. Horwitz, Ch. 68: Adenoviruses, FIELDS VIROLOGY B. N. Fields B.N. et al. eds. Lippincott – Raven Publishers, Philadelphia, 2149-2171, at 2165-2166 (1996); Ex. 2009 Spindler Decl. at ¶ 22).

51. Human adenoviral vectors with insertions in the essential region E1 are produced in complementing cell lines such as the human embryonic kidney "293" cell line, which expresses E1 proteins. (Ex. 2017 F. L. Graham, et al., Characteristics Of A Human Cell Line Transformed By DNA From Human Adenovirus Type 5, JOURNAL OF GENERAL VIROLOGY 36, 59-72 (1977); see Ex. 2016, Horwitz, supra at 2166, right column; Ex. 2009 Spindler Decl. at ¶ 23)

52. The Reddy patent-in-interference (the '343 patent) discloses "helper-dependent" recombinant adenovirus vectors grown in helper cell lines. (Ex. 2001 the '343 patent, col. 22 line 46 – col. 23, line 16)

53. By experimentation it is sometimes possible to identify certain areas of the adenovirus genome that are not essential to viral replication. (Ex. 2009 Spindler Decl. at ¶ 24)

54. When insertions of foreign DNA are made in non-essential regions, the result may be a "helper-independent" recombinant adenovirus. (Ex. 2009 Spindler Decl. at ¶ 24)

55. Adenoviruses have a limit to the amount of DNA that they can encapsidate. (Ex. 2035, Andrew J. Bett et al., Packaging Capacity and Stability of Human Adenovirus Type 5 Vectors JOURNAL OF VIROLOGY 67(10) 5911-5921 (1993)). (Ex. 2009 Spindler Decl. at ¶ 26)

56. In order to make room for foreign genes, it is sometimes useful to delete portions of the native adenovirus DNA. (Ex. 2009 Spindler Decl. at ¶ 26)

57. Deletions of native adenovirus DNA may prevent the expression of any genes that are associated with the deleted nucleotides. (Ex. 2009 Spindler Decl. at ¶ 26)

58. If expression of any essential genes is prevented, then the resulting adenovirus will not assemble into an infectious recombinant adenovirus particle except in a suitable complementary helper cell line. (Ex. 2009 Spindler Decl. at ¶ 26)

59. Johnson claims 26, 31 and 32 in the '512 Application include the additional limitation that the heterologous DNA be inserted into a "non-essential region" of the recombinant porcine adenovirus vector. (Ex. 2005)

60. The art relevant to the technology at issue in this interference is the preparation of animal adenovirus-based vectors for administration to mammals. (Ex. 2009 Spindler Decl. at ¶ 9).

61. A person having ordinary skill in this art in 1996-1999 would have had at least a Master's degree in the biological sciences and/or a Bachelor's degree with at least two years of experience in adenoviruses and have been familiar with scientific and technical publications concerning animal adenoviruses and in particular, porcine adenoviruses. (Ex. 2009 Spindler Decl. at ¶ 9).

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By: _____
Evelyne Guillouet

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Paper No. 30
03/31/06

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES
(Administrative Patent Judge Michael P. Tierney)

POLICE S. **REDDY**, SURESH K. TIKOO, and
LORNE A. BABIUK,
(U.S. Patent 6,492,343)
Junior Party,

v.

MICHAEL A. **JOHNSON**, JEFFREY M. HAMMOND,
RICHARD J. McCOY and MICHAEL G. SHEPPARD
(U.S. Application 09/485,512)
Senior Party,

Patent Interference No. **105,358**
(Technology Center 1600)

REDDY SUBSTANTIVE MOTION 2
(Motion under 37 CFR § 41.121(a)(I)(iii) for judgment based on unpatentability of all involved Johnson claims for failure to comply with 35 U.S.C. § 112, paragraph 1)

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REDDY SUBSTANTIVE MOTION 2
(Motion under 37 CFR § 41.121(a)(I)(iii) for judgment based on unpatentability of all involved Johnson claims for failure to comply with 35 U.S.C. § 112, paragraph 1)

I. REQUEST FOR RELIEF

Junior party REDDY, *et al.* ("Reddy") moves under 37 C.F.R. §§ 41.121(a)(I)(iii) for judgment based on the unpatentability of all involved Johnson claims for failure to comply with the written description and enablement requirements of 35 U.S.C. § 112, paragraph 1.

II. REASONS FOR RELIEF REQUESTED

A. Background

The claims at issue in the '512 application relate to insertion of foreign genes (or "heterologous DNA") into certain regions of Porcine Adenovirus 3 (PAV3). All of Johnson's claims in interference contain limitations directed to insertions of foreign ("heterologous") DNA within certain map unit ranges. Facts ¶¶ 1, 5, and 6. A genome is "mapped" by dividing the whole genome into 100 units. Fact ¶ 2.

If the foreign genes are inserted into a location that codes for polypeptides that are essential to viral replication, then the resulting adenovirus is "replication-defective." Fact ¶ 85. Replication-defective adenoviruses cannot be grown except in a complementing "helper" cell-line that can produce the essential products of the deleted region or regions of the adenovirus. Fact ¶¶ 86-87. In the absence of a complementing cell-line, viral DNA that has been recombined to eliminate or disable one or more essential genes will not express a virus. Fact ¶ 87. Such recombinants are therefore known as "helper-dependent" recombinants. Fact ¶ 88. By experimentation it is sometimes possible to identify certain areas of the adenovirus genome that are not essential to viral replication. Fact ¶ 89.

Johnson's claims in interference contain limitations directed to the incorporation of foreign DNA into PAV3 at map units 50-55, 55-65, 72-85. Fact ¶ 6. These map unit ranges are not described or mentioned anywhere in the '512 application. Fact ¶ 14-15, 21. Rather, they were submitted for the first time on August 13, 2004, shortly before *ex parte* prosecution of the application was suspended. Fact ¶ 15. Moreover, these map unit ranges correspond to areas of PAV3 that are predicted to be essential for viral replication, and insertions made in those map unit ranges are highly likely to disrupt the expression of one or more these essential areas. Fact ¶ 23-28. The '512 application does not describe or enable the helper cell lines needed to grow replication-defective virus. Fact ¶¶ 32-34.

The two map unit ranges that are disclosed in the '512 application are ranges 81-84 and 97-99.5. Fact ¶¶ 37, 56. However, as discussed below both of these regions also incorporate regions of the genome that are essential to viral replication. Fact ¶¶ 36-51, 56-69.

B. Legal Standard

All of the Johnson claims in interference are unpatentable because the '512 application fails to adequately describe and enable them in terms sufficient to fulfill the requirements of 35 U.S.C. § 112 paragraph 1. The written description requirement ensures "that, as of the filing date, the inventor conveyed with reasonable clarity to those of skill in the art that he was in possession of the subject matter" in question. *Union Oil Co. v. Atlantic Richfield Co.*, 208 F.3d 989, 997, 54 U.S.P.Q.2d 1227, 1232 (Fed. Cir. 2000). The application "itself must describe an invention, and do so in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention as of the filing date sought." *Lockwood v. American Airlines, Inc.*, 107 F.3d

1565, 1572, 41 U.S.P.Q.2d 1961, 1966 (Fed. Cir. 1997); *see also In re Barker*, 559 F.2d 588, 592 n. 4, 194 U.S.P.Q. 470, 473 (CCPA 1977) (the essential goal of the written description requirement is "to clearly convey the information that an applicant has invented the subject matter which is claimed"). The purpose of the written description requirement "is to ensure that the scope of the right to exclude . . . does not overreach the scope of the inventor's contribution to the field of art as described in the patent specification." *Reiffin v. Microsoft Corp.*, 214 F.3d 1342, 1345, 54 U.S.P.Q.2d 1915, 1917 (Fed. Cir. 2000).

To be enabling, "there must be sufficient disclosure, either through illustrative examples or terminology, to teach those of ordinary skill how to make and use the invention as broadly as it is claimed."[1] *Enzo Biochem, Inc. v. Calgene, Inc.*, 188 F.3d 1362, 1374, 52 U.S.P.Q.2d 1129, 1138 (Fed. Cir. 1999). The scope of the claims must "bear a reasonable correlation to the scope of enablement provided by the specification[.]" *See In re Wright*, 999 F.2d 1557, 1561, 1562-64, 27 U.S.P.Q.2d 1510, 1513, 1514-15 (Fed. Cir. 1993) (affirming PTO's rejection of claims where the single example in the specification, which was limited to a description of the production of a recombinant vaccine that conferred immunity in chickens against a certain type of RNA tumor virus, did not enable the full scope of the claims to "*any and all* live, non-pathogenic vaccines, and processes for making such vaccines, which elicit immunoprotective activity in *any* animal toward *any* RNA virus") *id. In re Wright*, 999

[1] Whether claims are sufficiently enabled is determined as of the date the patent application was first filed, which in this case is August 1997. *Enzo BioChem, Inc.*, 188 F.3d at 1371, 54 U.S.P.Q.2d at 1135.

F.2d at 1562, 27 U.S.P.Q.2d at 1513; *In re Goodman*, 11 F.3d 1046, 1049, 29 U.S.P.Q.2d 2010, 2012-13 (Fed. Cir. 1993) (the PTO did not err by rejecting, on enablement grounds, applicant's broad claims to a method for producing any type of mammalian protein in any type of plant cell where the specification included only a single working example that was directed to only one particular species of plants).

An applicant cannot rely on what was well known in the art as a substitute for an enabling disclosure of his invention. As the Federal Circuit held:

> [R]easonable detail must be provided in order to enable members of the public to understand and carry out the invention. . . . . It is true . . . that a specification need not disclose what is well known in the art. However, that general, oft-repeated statement is merely a rule of supplementation, not a substitute for a basic enabling disclosure. It means that the omission of minor details does not cause a specification to fail to meet the enablement requirement.

Genentech, Inc. v. Novo Nordisk, A/S, 108 F.3d 1361, 1366, 42 U.S.P.Q.2d 1001, 1005 (Fed. Cir. 1997) ("*Novo Nordisk*") (citations omitted) (invalidating patent because specification failed to enable practice of the claimed method). The Federal Circuit has explained that "it is the specification, not the knowledge of one skilled in the art that must supply the novel aspects of an invention in order to constitute adequate enablement." *Id.*

Where the art is unpredictable, "the required level of disclosure will be greater than, for example, the disclosure of a 'predictable' factor such as a mechanical or electrical element." *In re Vaeck*, 947 F.2d 488, 496, 20 U.S.P.Q.2d 1438, 1445 (Fed. Cir. 1991); *see also In re Goodman*, 11 F.3d at 1051. Furthermore, "[t]ossing out the mere germ of an idea does not constitute enabling disclosure." *Enzo BioChem, Inc.*, 188 F.3d at 1374, 52 U.S.P.Q.2d at 1138 (*citing Novo Nordisk.*, 108 F.3d at 1366, 42 U.S.P.Q.2d at 1005).

C. The '512 Application Does Not Describe or Enable PAV3 Incorporating Foreign DNA at Insertion Sites MU 50-55, 55-65, or 72-85.

Johnson claim 1 reads:

> A recombinant porcine adenovirus expressing heterologous DNA, said DNA of interest being stably integrated into a site of said recombinant porcine adenovirus genome wherein said site is selected from the group consisting of one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84, and 97-99.5 of PAV3.

This claim is representative of claims 1-2, 4, 26, 31, 39-40, 42, 44-65, 67, 68-69, 72-73 in that each of these claims includes within its scope recombinant adenoviruses with an insertion made in a site consisting of one or more of the map units 50-55, 55-65, 72-85.[2]

Map units 50-55, 55-65, 72-85 are not mentioned or otherwise described anywhere in the '512 specification. Fact ¶ 7. Nor were these limitations part of the original claims submitted with the '512 application. Fact ¶ 14. They were submitted for the first time on August 13, 2004, shortly before *ex parte* prosecution of the application was suspended. Fact ¶ 15. Nothing in the '512 application indicates that Johnson had conceived and reduced to practice a recombinant PAV3 incorporating foreign DNA in any of these map units. Fact ¶ 16.

During the prosecution of the '512 patent, Johnson submitted testimony identifying prior art publications where sequences allegedly corresponding to map units 50-55, 55-65, and 72-85 of PAV3 were published. Fact ¶ 17. Johnson's declaration argued that a person of skill in the art could have made insertions of foreign DNA in

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[2] Claims directed to insertions made at map units 81-84 and 97-99.5 are discussed below in sections D and E respectively.

these regions of PAV3 relying on these publications. Fact ¶ 18. Even assuming that to be true (in fact it is not true, for reasons discussed below), that still does not address the fact that these references are not cited anywhere in the '512 application. Fact ¶ 19. To fulfill the written description requirement, it is necessary for Johnson to have either disclosed the map unit limitations in the '512 application, or else to have expressly referred to or incorporated by reference the publications that disclose them. *See Forssmann v. Matsuo et al.*, 23 U.S.P.Q.2d 1548, 1551 (BPAI 1992) (description of hormone containing 126 amino acids and hormone fragments generally was insufficient to support claims to specific amino acids 99 to 126 of the hormone). Having failed to do either, the '512 application does not demonstrate that Johnson was in possession of the invention described in claims 1-4, 26, 31, 39-40, 42, 44-65, 67, 68-69, 72-73 at the time of filing. Fact ¶ 20.

Johnson first added map-unit limitations to his claims in an amendment dated February 27, 2004, in which he purported to limit his claims to the right hand end of the genome "from about 50 genomic map units to 100 genomic map units." Fact ¶ 78. He argued that support was found in the disclosure of insertions of foreign genes into the "right hand end of the genome." Fact ¶ 79. The specification makes clear, however, that the term "right hand end of the genome" in Johnson's disclosure refers only to map units 97-99.5, not the entire right half of the genome from map units 50 to 100. Fact ¶ 80. For this additional reason, the '512 application fails to describe claims directed to insertions into map units 50-55, 55-65, and 72-85 of PAV3.

The '512 application also fails to enable the above-listed claims. First, no gene sequence is provided for the these segments of PAV3, nor are the restriction enzymes

associated with these segments identified. Fact ¶ 21. Accordingly, the '512 application does not provide any teaching to enable a person of skill in the art to make insertions within these segments. Facts ¶ 22 and 27.

Second, each of regions 50-55, 55-65, and 72-85 of PAV3 includes nucleotides that are associated with genes coding for structural proteins that are predicted to be essential for viral replication. Facts ¶¶ 23 and 26. Specifically, map units 50-55, 55-65, 72-85 encompass coding regions for PAV3 pVI, pX, pV, endonuclease, hexon, pVIII, 33K and 100K. Fact ¶ 24. Reddy's PAV3 genome map shows this. Fact ¶ 25. Each of these regions contain genes that express structural elements, including pVI, hexon and the pVIII proteins, without which PAV3 has not been shown to be able to replicate except with the use of a helper cell line. Fact ¶ 26. Insertions made in these regions would likely disable these genes, thus rendering the recombinant virus replication-defective. Fact ¶ 28.[3]

Nothing in the '512 application teaches the use of helper cell lines that would make it possible for a person of ordinary skill in the art to grow a replication-defective virus. Fact ¶ 32. Nor were suitable PAV3 helper cell lines available in the art at the time the '512 application was filed. Facts ¶¶ 33 and 34. Accordingly, even if a person of skill in the art could have succeeded in making an insertion in one of the above-listed regions in PAV3 viral DNA, the resulting recombinant DNA would likely not form a virus. Facts ¶¶ 28 and 31. Accordingly, such a person would fail to create a "porcine adenovirus" of

[3] The '512 application teaches insertion of "cassettes" of homologous DNA that include polyA signals which signal the end of transcription. Fact ¶ 29. Inserting a polyA signal into the middle of a gene disables expression of the gene. Fact ¶ 30.

the claims. Facts ¶¶ 28 – 31. Thus, the '512 application fails to enable a person of ordinary skill in the art to practice the full scope of Johnson claims 1-4, 26, 31, 39-40, 42, 44-65, 67, 68-69, 72-73. Fact ¶ 22.

D. The '512 Application Does Not Enable PAV3 Incorporating Foreign DNA at Map Units 97-99.5

Johnson claims 28 and 71 are directed to a recombinant PAV3 incorporating foreign DNA in the region identified as encompassing map units 97 to 99.5. Fact ¶ 36. Representative claim 28 reads:

> A recombinant vector as claimed in claim 2 wherein said heterologous DNA is stably integrated into the right hand end of the genome at map units from about 97 to about 99.5.

Fact ¶ 36.

The '512 application teaches that map units 97-99.5 encompass:

> . . . non-essential regions of the viral genome which may be suitable for the purposes of replacement with or insertion of heterologous DNA.

Fact ¶ 37.

No matter how the claim term "97-99.5" is construed,[4] map units 97-99.5 in fact encompass nucleotides that are indeed essential to viral replication. Fact ¶ 40. Accordingly, for the same reasons that the '512 application fails to enable the practice of the full scope of claims directed to insertions at map units 50-55, 55-65, and 72-85, so too

[4] As explained in Reddy's Substantive Motion No. 3, the claims' reference to "map units" is hopelessly ambiguous. No matter how the map units are construed, however, the claims are not enabled.

does it fail to enable the scope of claims directed to insertions at map units 97-99.5. Fact ¶ 54.

Early region 4 ("E4") of PAV3 includes genes that are essential to viral replication. Facts ¶41 and 42. As shown in the genome maps above, map units 97-99.5 plainly encompass the E4 region. Fact ¶ 8. Accordingly, insertions made between map units 97-99.5 can be expected in some cases to disable the genes expressed in E4, thus rendering the virus replication-defective. Fact ¶ 42.

Figure 4 of the '512 application purports to identify the putative TATA site for the E4 promoter, "this being the left most end for the possible site of insertion." Fact ¶ 39. A TATA site is a sequence of nucleotides that is essential for the expression of the genes that are associated with it. ¶ 40.

The figure identifies the referenced TATA site in bold type at nucleotides 698-701. Fact ¶ 43. The map unit range of 97 to 99.5 of claim 28 approximates the area between the bolded ITR and the bolded TATA site in Figure 4. Fact ¶ 44. Presumably, Johnson identifies the E4 promoter as the "left most end" for insertion because he expects that if the E4 promoter were disabled, the resulting virus would be rendered replication-defective. Facts ¶¶ 39-42.

The TATA site called out in Figure 4, however, is in fact not the TATA site for the E4 promoter; on the contrary, it is located in the middle of E4 open reading frame 2. Fact ¶ 45. The true TATA site for the E4 promoter is located much closer to the ITR, and is shown at nucleotides 326 through 329 in Figure 4. Facts ¶ 46 and 47. This is well within map units 97 to 99.5. Fact ¶ 44. Thus, the range 97 to 99.5 is mischaracterized in the '512 Application. Facts ¶¶ 49-51. The reader of the '512 Application is led to

believe that the 97 to 99.5 range does not encompass the E4 promoter, when in fact it clearly does. Facts ¶¶ 47-51.

Following the teachings of the '512 application, a person of ordinary skill in the art attempting to practice the full scope of the claims would make some insertions that would disable the essential genes of the E4 region. Facts ¶¶ 51 and 52. As discussed above, replication-defective viruses are not enabled in the '512 application because helper cell lines capable of growing replication-defective viruses were not known in the art and are not disclosed in the application. Facts ¶¶ 32 and 33. Accordingly, based on the teachings of the '512 application and the prior at as it was at the time of filing, it would not have been possible for a person of ordinary skill in the art to practice the full scope of claims 28 and 71. Facts ¶¶ 51-54.

E. The '512 Application Does Not Enable PAV3 Incorporating Foreign DNA in the E3 Region at Map Units 81 to 84.

Johnson claim 30 is directed to:

> A recombinant vector as claimed in claim 2 wherein said heterologous DNA is stably integrated into the adenovirus E3 region of the genome at map units from about 81 to about 84.

The '512 Application fails to describe or enable the full scope of this claim.

First, the '512 application does not describe or enable integrations of foreign DNA into the "E3 region," as it is described and defined in the patent. E3 is described as overlapping L4, and Johnson suggests that insertions to E3 might be made after the polyadenylation signal of L4. Facts ¶ 57 and 58. E3 does not actually overlap with L4 in PAV3; rather it overlaps with L5. Fact ¶ 57. Johnson's '512 application characterizes map units 81-84 as a "non-coding region" of E3. Fact ¶ 56. However, there is no non-coding region in E3. Fact ¶ 57. E3 encodes for several genes that modulate the response

of the host cells to adenovirus infection. Fact ¶ 65. Thus, the '512 Application does not enable insertions into a non-coding region. Further, there is no portion of E3 after the polyadenylation signal of L5. Fact ¶ 62. E3 and L5 share a common polyadenylation signal, which indicates that they are co-terminal. Id. Accordingly, it is impossible to follow Johnson's suggestion to make an insertion into E3 after the polyadenylation of L5.

Second, the '512 application does not describe or enable integrations of foreign DNA "at map units from about 81 to 84." As explained in Reddy's Substantive Motion 3, the "about 81 to 84" limitation of this claim is indefinite because it does not specify to which nucleotides it refers and the '512 is inconsistent in its description of the size of the genome. If the Board were to construe the claim, however, it should employ the principle that claims in prosecution should be given their broadest reasonable construction. See, *In re Hyatt*, 211 F.3d 1367, 1372 (Fed. Cir. 2000); *Scripps Research Institute v. Genentech, Inc.*, 2005 Pat. App. LEXIS 19, *10 (B.P.I.A. Feb. 28, 2005) (applying the "broadest reasonable construction" to claims in patent interference). Under such a construction, the full scope of this claim would not be enabled.

There are three possible interpretations of the range of about 81 to 84, based on the three genome sizes disclosed in the '512 application (34.8 kb, 35kb and 34,094 bp). Fact ¶ 10. Using 34,094 map units, 81 to 84 corresponds to nucleotides 27,616 to 28,639. Fact ¶ 83. Using the genome size 34.8 kb, map units 81 to 84 correspond to nucleotides 28,188 to 29,232. Fact ¶ 64. And using 35 kb map units, 81 to 84 corresponds to nucleotides 28,350 to 29,400. Fact ¶ 84. Thus, the range 81 to 84 according to the disclosure of the '512 application could reasonably be interpreted to encompass an insertion into the genome at anywhere from about nucleotide 27,616 to about nucleotide 29,232, and the broadest of the three individual ranges listed above is the range 28,350 to 29,400.

Encompassed within both of these ranges of nucleotides portion of the DNA that forms part of the essential fibre gene, which has a splice acceptor site at 28910. Fact ¶¶

66-68. Thus, some insertions that might be made within this range would disable the expression of fibre. Fact ¶¶ 29, 30, 66-69. This would render the virus replication-defective and helper-dependent. Fact ¶ 66-69. The '512 Application does not enable the use of helper cells for the reproduction of helper-dependent recombinants, however. Facts ¶ 68-70. Thus, for this reason as well, the '512 Application fails to enable the full scope of claim 30. Fact ¶ 71.

F. Claims 1, 2, 4, 28, 30, 44-62, 65, 66 and 71-73 Are Invalid Because the Claims Encompass Replication Defective Recombinant PAV3 Adenoviruses that Are Not Described or Enabled

Nearly all of Johnson's involved claims (Claims 1, 2, 4, 28, 30, 44-62, 65, 66 and 71-73) are generic claims that cover insertions into regions of PAV3 regardless of whether the region is essential or non-essential. For example, Johnson Claim 2 specifies a recombinant PAV3 adenovirus with heterologous DNA inserted into one of a specified list of insertion sites. A virus within the scope of Johnson Claim 2 could be replication competent (if the heterologous DNA was inserted into a non-essential site) or replication defective (if the heterologous DNA was inserted into an essential site). The generic nature of these claims is confirmed by the doctrine of claim differentiation: the only distinction between Claim 2 and dependent Claim 26 is the additional requirement in Claim 26 (not found in Claim 2) that the heterologous DNA be inserted into a "non-essential region." Fact ¶ 72.

When claims generically cover species, some of which are not enabled or described, the claims are invalid under section 112. *In re Goodman*, 11 F.3d 1046, 1052 (Fed. Cir. 1993) (claim generically covering gene transformation of plants invalid when the patent provided no reliable gene transformation method for use with monocot plants, and the method of transforming for monocot plants was "fraught with unpredictability"); *Adang v. Fischhoff*, 286 F.3d 1346, 1350 (Fed. Cir. 2002) (disclosure of transformation

of tobacco plant did not enable transformation of entirely different species such as tomato); *Plant Genetic Sys. v. DeKalb Genetics Corp.*, 315 F.3d 1335, 1337-1338 (Fed. Cir. 2003) (claim to plant cell having heterologous DNA stably integrated into its genome was invalid because patent did not enable insertions of heterologous DNA into monocot plants, stably transformed monocot cells were difficult to produce, and the patent gave no instruction as to how).

The Johnson claims are invalid under this rule: each of these claims generically covers insertions into essential and non-essential regions. Yet the '512 application neither describes nor enables the production of recombinant adenoviruses through insertion into essential regions. The claims therfore do not meet the requirements of section 112.

G. The '512 Application Does Not Describe or Enable Insertions Into Non-Essential Regions of PAV3

Johnson claim 26 is directed to:

> A recombinant vector as claimed in claim 2 wherein said heterologous DNA is stably integrated into the non-essential regions of the porcine adenovirus genome.

Fact ¶ 72.

The '512 application fails to describe and enable this claim because it fails to provide the reader sufficient guidance as to which regions of PAV3 are non-essential and which are essential. Fact ¶ 77. At the time of filing, it was not known which regions of PAV3 would prove to be essential for viral replication. Facts ¶¶ 73 and 74. Indeed, this is a question that is still under active investigation in the art. Fact ¶ 75. Nor is it possible to predict with confidence which regions of PAV3 are non-essential based on an understanding of other PAV serotypes or non-porcine adenovirus. Fact ¶ 76. Homology between PAV3 and other PAV serotypes is not sufficient to identify essential PAV3 regions based information that may be available regarding other PAV serotypes. Fact ¶

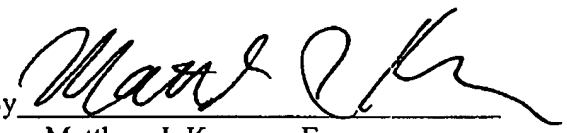
76. Certainly, homology between PAV3 and human adenovirus is not sufficient to identify the non-essential regions of PAV3 based on an understanding of the non-essential regions of human adenovirus. Fact ¶ 76. But without this information, it is impossible for a person of ordinary skill in the art to practice the full scope of this claim. Fact ¶ 77.

III. CONCLUSION

Johnson's claims fail to satisfy the written description and enablement requirements. Reddy respectfully requests that the Board grant this motion and find Johnson's claims invalid under 35 U.S.C. § 112.

Respectfully submitted,

Dated: February 24, 2006

By 

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APPENDIX A (EVIDENCE IN SUPPORT OF THE MOTION)

In support of this motion, Reddy relies on Reddy Exhibit Nos. 2001-2004, 2009, 2013, 2014, 2016, 2022, 2025, 2029, 2032, and 2033:

1. Reddy et al., U.S. Patent No. 6,492,343 (filed Apr. 14, 1999) (issued Dec. 10, 2002) (the "'343 patent") (Ex. 2001).
2. Johnson U.S. Patent Application No. 09/485,512, filed May 5, 2000 (Ex. 2002).
3. Johnson Australian Provisional Patent Application No. PO 8560, filed August 14, 1997 (Ex. 2003).
4. Johnson International Patent Application No. PCT/AU98/00648, filed August 14, 1998 (Ex. 2004).
5. Declaration of Katherine J. Spindler, Ph.D. dated February 22, 2005. (Ex. 2009).
6. Johnson Clean Copy of Claims, 9 pages (Ex. 2013).
7. Thomas Shenk, Ch. 67: *Adenoviridae: The Viruses and Their Replication.* FIELDS VIROLOGY, 2111-2148 (3rd ed., B.N. Fields et al. eds. Lippincott – Raven Publishers, Philadelphia, 1996). (Ex. 2014).
8. Marshall S. Horwitz, Ch. 68: *Adenoviruses,* FIELDS VIROLOGY B. N. Fields B.N. et al. eds. Lippincott – Raven Publishers, Philadelphia, 2149-2171 (1996) (Ex. 2016).
9. P. Seshidhar Reddy et al., Sequence Analysis of Putative pVIII, E3 and Fibre Regions of Porcine Adenovirus Type 3, VIRUS RESEARCH 36, 97-106. (1995) (Ex. 2022).

10. P. Seshidhar Reddy et al., *Characterization of the early region 4 of porcine adenovirus type 3*, VIRUS GENES 15, 87-90 (1997) (Ex. 2025).

11. P. Seshidhar Reddy et al., *Nucleotide Sequence and Transcription Map Of Porcine Adenovirus Type 3,* VIROLOGY 251(2):414-426 (1998) (Ex. 2029).

12. Response to Final Office Action filed with the U.S. Patent and Trademark Office on August 13, 2004, 9 pages (Ex. 2032).

13. Second Declaration of Dr. Jeffrey Michael Hammond Under 37 C.F.R. §1.132, 7 pages, with Response to Office Action mailed on February 27, 2004, 19 pages (Ex. 2033).

APPENDIX B (STATEMENT OF MATERIAL FACTS)

1. Claim 1 of the '512 application is directed to a PAV3 vector where the insertion site is "selected from the group consisting of one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84, and 97-99.5 of PAV3." (Ex. 2002 and Ex. 2009 Spindler Decl. at ¶¶ 36 and 54 (*citing* Ex. 2013)).

2. A genome is "mapped" by dividing the whole genome into 100 units. (Ex. 2009 Spindler Decl. at ¶ 18).

3. At the time that the '512 application was filed, the full genome of PAV3 had not been sequenced, and the arrangement of the various elements of PAV3 that had been sequenced had not been published. (Ex. 2002 and Ex. 2009 Spindler Decl. at ¶¶ 31 and 32 (*citing* Ex. 2029 at page 420, Figure 1)).

4. The specific point to which a given map unit (for example, 81) refers depends on the size of the genome. Map unit 81 refers to the 810th base in a genome of 1000 base, and to the 4,050th base in a genome of 5000 bases, for example. (Ex. 2009 Spindler Decl. at ¶ 18).

5. All of Johnson's claims contain one or more map unit limitations of the kind included in Claim 1. (Ex. 2009 Spindler Decl. at ¶ 54 (*citing* Ex. 2002)).

6. Claims 1-4, 26, 31, 39-40, 42, 44-65, 67, 68-69, and 72-73 each specify that insertion of the foreign DNA is to be made in one or more of the map unit ranges 50-55, 55-65, or 72-85. (Ex. 2009 Spindler Decl. at ¶ 55 (*citing* (Ex. 2002, at page 22-26, and preliminary amendment at pages 1 and 2)).

7. Map units 50-55, 55-65, and 72-85 are not mentioned or otherwise described anywhere in the '512 application, and the '512 application does not incorporate by reference any publications that disclosed the sequences of these regions. (Ex. 2009 Spindler Decl. at ¶ 56 (*citing* Ex. 2002)).

8. Reddy published a paper in 1998 that included a "genome map" of PAV3 that shows the arrangement of the PAV3 genes in the genome. (Ex. 2009 Spindler Decl. at ¶ 31 (*citing* Ex. 2029 at page 420, Figure 1)).

9. Johnson's Australian priority application describes the size of the PAV3 genome as being 34.8 kb. (Ex. 2003 at page 4, line 21).

10. In its present form, the '512 Application simultaneously discloses three different sizes for the PAV3 genome. These are 34.8 kb, 35kb and 34,094 bp. (Ex. 2009 Spindler Decl. at ¶ 37(*citing* Ex. 2002 at page 3, lines 27-28; Figure 1; and Figure 15)).

11. The reference to 35kb appears for the first time in the original PCT filing at Figure 1. (Ex. 2004).

12. The '512 Application nowhere defines which of these three sizes is to be used as the basis for the map unit ranges set forth in the claims. (Ex. 2009 Spindler Decl. at ¶ 37 (*citing* Ex. 2002)).

13. Reddy demonstrated in 1998 that the correct size of the PAV3 genome is 34,094 bp. (Ex. 2009 Spindler Decl. at ¶ 35 (*citing* Ex. 2029)).

14. Map units 50-55, 55-65, and 72-85 were not part of the original claims submitted with the '512 application. (Ex. 2002 and Ex. 2009 Spindler Decl. at ¶ 56).

15. The limitations of map units 50-55, 55-65, and 72-85 were submitted for the first time on August 13, 2004, shortly before *ex parte* prosecution of the application was suspended. (Ex. 2032)

16. Nothing in the '512 application indicates that Johnson had conceived and reduced to practice a recombinant PAV3 incorporating foreign DNA in any of the map units 50-55, 55-65, and 72-85. (Ex. 2009 Spindler Decl. at ¶¶ 55-60 (*citing* Ex. 2002 at page 22-26, and preliminary amendment at pages 1 and 2)).

17. During the prosecution of the '512 patent application, Johnson submitted testimony identifying prior art publications where sequences allegedly corresponding to

map units 50-55, 55-65, and 72-85 of PAV3 were published. (Ex. 2009 Spindler Decl. at ¶ 48 (*citing* Ex. 2033)).

18. Johnson's declaration argued that a person of skill in the art could have made insertions of foreign DNA in these regions of PAV3 relying on these publications. (Ex. 2033 and Ex. 2009 Spindler Decl. at ¶ 56).

19. Even assuming that to be true (in fact it is not true, for reasons discussed below), that still does not address the fact that these references are not cited anywhere in the '512 application (Ex. 2009 Spindler Decl. at ¶¶ 55-60 (*citing* Ex. 2002)).

20. Having failed either to disclose the map unit limitations in the '512 application, or to have expressly referred to or incorporated by reference the publications that disclose them, the '512 application does not demonstrate that Johnson was in possession of the invention described in claims 1-4, 26, 31, 39-40, 42, 44-65, 67, 68-69, 72-73 at the time of filing. (Ex. 2002; Ex. 2009 Spindler Decl. at ¶¶ 55-60 (*citing* Ex. 2002)).

21. No gene sequence is provided for map units 50-55, 55-65, and 72-85 of PAV3, nor are the restriction enzymes associated with these segments identified in the '512 application. (Ex. 2009 Spindler Decl. at ¶ 56 (*citing* Ex. 2002)).

22. The teachings of the '512 Application do not enable one of skill in the art how to make and use a PAV3 vector with insertions within map units 50-55, 55-65, 72-85 without undue experimentation. (Ex. 2009 Spindler Decl. at ¶ 60 (*citing* Ex. 2002)).

23. Map units 50-55, 55-65, 72-85 correspond to areas of PAV3 that are predicted to be essential for viral replication based on what was known about human adenovirus type 2. (Ex. 2009 Spindler Decl. at ¶ 57 (*citing* Ex. 2014, Shenk, at page 2131, right column)).

24. Specifically, map units 50-55, 55-65, 72-85 encompass coding regions for PAV3 pVI, pX, pV, endonuclease, hexon, pVIII, 33K and 100K. (Ex. 2009 Spindler Decl. at ¶ 57 (*citing* Ex. 2001, '343 patent at Figure 2)).

25. Reddy's PAV3 genome map shows that map units 50-55, 55-65, 72-85 encompass coding regions for PAV3 pVI, pX, pV, endonuclease, hexon, pVIII, 33K and 100K. (Ex. 2009 Spindler Decl. at ¶ 31 (*citing* Ex. 2029 at page 420, at Figure 1)).

26. None of pVI, pX, pV, endonuclease, hexon, pVIII, 33K and 100K is known to be non-essential for PAV3 replication. (Ex. 2009 Spindler Decl. at ¶ 57 (*citing* Ex. 2001)).

27. The '512 application does not teach the locations and characterizations, if any, of non-essential regions within map units 50-55, 55-65, 72-85 of PAV3. (Ex. 2009 Spindler Decl. at ¶ 57 (*citing* Ex. 2002)).

28. Insertions made in map unit regions 50-55, 55-65, 72-85 of PAV3 are highly likely to disrupt the expression of one or more of pVI, pX, pV, endonuclease, hexon, pVIII, 33K and 100K. (Ex. 2009 Spindler Decl. at ¶¶ 57-58 (*citing* Ex. 2002)).

29. The '512 application teaches insertion of "cassettes" of homologous DNA that include polyA signals which signal the end of transcription. (Ex. 2009 Spindler Decl. at ¶ 56 (*citing* Ex. 2003, at page 14, lines 4-9.)).

30. Inserting a polyA signal into the middle of a gene disables expression of the gene. (Ex. 2009 Spindler Decl. at ¶ 22).

31. Disruption of the expression of pVI, pX, pV, endonuclease, hexon, pVIII, 33K or 100K would render the product replication-defective. (Ex. 2009 Spindler Decl. at ¶ 58).

32. Nothing in the '512 application teaches the use of helper cell lines which would make it possible for a person of ordinary skill in the art to grow a replication-defective PAV3. (Ex. 2009 Spindler Decl. at ¶ 59).

33. In August 1997, no helper cell lines for growing any replication-defective form of PAV3 were available. (Ex. 2009 Spindler Decl. at ¶ 59).

34. Extensive experimentation is required to produce a new helper cell line. (Ex. 2009 Spindler Decl. at ¶ 59 (*citing* Ex. 2016, Horwitz, at page 2166)).

35. The teachings of the '512 Application do not clearly convey that Johnson had possession of any recombinant PAV3 incorporating foreign DNA into map units 50-55, 55-65, 72-85. (Ex. 2009 Spindler Decl. at ¶ 60).

36. Johnson claims 28 and 71 are directed to a recombinant PAV3 incorporating heterologous DNA in the region identified as encompassing map units 97 to 99.5 (Ex. 2009 Spindler Decl. at ¶ 61 (*citing* Ex. 2002)).

37. The '512 application teaches that map units 97-99.5 encompass "[n]on-essential regions of the viral genome which may be suitable for the purposes of replacement with or insertion of heterologous nucleotide sequences." (Ex. 2009 Spindler Decl. at ¶ 61).

38. The '512 application discloses a non-essential region where insertions can be made as "regions at the right terminal end of the genome at map units 97-99.5." (Ex. 2009 Spindler Decl. at ¶ 62 (*citing* Ex. 2002, at page 5, line 18-20)).

39. The '512 application purports to further specify the area for insertion in Figure 4, which allegedly identifies the putative TATA site for the E4 promoter, "this being the left most end for the possible site of insertion." (Ex. 2009 Spindler Decl. at ¶ 62 (*citing* Ex. 2002 at page 11, lines 29-30)).

40. A TATA site is a sequence of nucleotides that is essential for the expression of the genes that are associated with it. (Ex. 2009 Spindler Decl. at ¶ 62).

41. E4 plays major roles in late gene expression and regulation of transcription. (Ex. 2009 Spindler Decl. at ¶ 63 (*citing* (Ex. 2025 Reddy (1997) at page 87)).

42. Because E4 is an essential region, an insertion downstream of the TATA site could disrupt E4 expression and destroy the PAV3 vector's ability to replicate. (Ex. 2009 Spindler Decl. at ¶ 63).

43. Figure 4 of the AU application identifies the referenced TATA site in bold type at nucleotides 698-701. (Ex. 2009 Spindler Decl. at ¶ 64 (*citing* Ex. 2003)).

44. The map unit range of 97 to 99.5 approximates the area between the bolded ITR (nucleotides 1-144) and the bolded TATA site in Figure 4. (Ex. 2009 Spindler Decl. at ¶ 64).

45. The TATA site called out in Figure 4 of the AU application, (Ex. 2003) however, is not the TATA site for E4 transcription. (Ex. 2009 Spindler Decl. at ¶ 65 (*citing* Ex. 2025, Reddy (1997) at page 88, Figure 1)).

46. Ex. 2025 (Reddy et al.) showed a physical map of the PAV3 genome of a 3028 nucleotide fragment encompassing the right end of the genome as Figure 1. (Ex. 2009 Spindler Decl. at ¶ 65).

47. In Figure 1, Reddy identified features including the locations of the right hand ITR, the E4 region, the polyA signal and two TATA sites corresponding to putative transcription initiation sites. (Ex. 2009 Spindler Decl. at ¶ 65 (*citing* Ex. 2025 Reddy (1997), at page 88, at Figure 1)).

48. Pages 88-89 of the Reddy paper report the results of experiments to determine the 5'-end of the E4 transcripts. (Ex. 2025; Ex. 2009 Spindler Decl. at ¶ 66)

49. The data in the Reddy paper indicate that transcription initiates 22-24 nucleotides downstream from the 3' end of the TATA box between nucleotides 324 and 327. (Ex. 2009 Spindler Decl. at ¶ 66 (*citing* Ex. 2025, Reddy (1997), at pages 88-89)).

50. Thus, the active TATA site for E4 corresponds to nucleotides 324-327 shown in Figure 4 of Johnson's AU application (Ex. 2009 Spindler Decl. at ¶ 66 (*citing* Ex. 2003)).

51. Thus, claims 28 and 71 of the '512 Johnson application encompass within their scope portions of E4 that are essential to viral replication – namely portions of the E4 region genes, including the TATA site of E4. (Ex. 2002; Ex. 2009 Spindler Decl. at ¶ 67).

52. Some of the embodiments of these claims could disable the E4 region genes, rendering the virus helper-dependent. (Ex. 2009 Spindler Decl. at ¶ 67).

53. To practice the full scope of these claims, it would be necessary to provide a helper cell line capable of replacing the function of the disabled E4 genes. (Ex. 2009 Spindler Decl. at ¶ 67).

54. Because the '512 application does not describe a suitable helper cell line or enable a person of skill in the art to produce such a cell line without undue experimentation, the teachings of the '512 Application do not enable one of skill in the art how to make and use a PAV3 vector with insertions within the full range of map units 97-99.5 without undue experimentation. (Ex. 2002; Ex. 2009 Spindler Decl. at ¶ 68).

55. In the priority AU application, no map unit range is disclosed for the E3 region. (Ex. 2003)

56. The '512 Application describes the range of 81-84 as being a "non-coding region" that overlaps with L4. (Ex. 2009 Spindler Decl. at ¶ 69 (*citing* Ex. 2002, at page 5, lines 20-21, and page 11, line 33)).

57. There are no non-coding regions of E3. (Ex. 2009 Spindler Decl. at ¶¶ 69 and 71).

58. E3 does not overlap with L4. (Ex. 2009 Spindler Decl. at ¶ 69).

59. Johnson's original PCT application discloses two PAV genome sizes of 34.8 kb, or 35 kb (Ex. 2004 at page 4 line 20 and Figure 1).

60. The '512 Application suggests inserting foreign DNA into the E3 region after the polyadenylation signal of L4. (Ex. 2009 Spindler Decl. at ¶ 70 (*citing* (Ex. 2002, at page 11, bridging sentence to page 12)).

61. A person of skill in the art might interpret the term "L4" in the '512 Application to refer to L5 of PAV3, since L5 is analogous to the L4 region of the well-known HAV2. (Ex. 2009 Spindler Decl. at ¶ 70).

62. The end of a messenger RNA is formed 10 to 30 nucleotides downstream of the polyadenylation signal which is a specific nucleotide sequence (AAUAAA). Thus, the polyadenylation signal is found 10-30 nucleotides upstream from the end point of the

genes associated with a given region. As a result, genes that share a common polyadenylation signal are co-terminal. In PAV3, E3 and L5 share a common polyadenylation signal. (Ex. 2009 Spindler Decl. at ¶ 49).

63. The '512 Application does not enable a person of skill in the art to insert foreign DNA into a "non-coding region" of E3 after the polyadenylation signal of L5. (Ex. 2002; Ex. 2009 Spindler Decl. at ¶ 72).

64. Using the 34.8 kb PAV3 genome size disclosed in the AU application and the unamended PCT, map unit ranges 81 to 84 correspond to nucleotides 28,188 and 29,232 of PAV3. (Ex. 2009 Spindler Decl. at ¶ 72).

65. E3 encodes for several genes that modulate the response of the host cells to adenovirus infection. (Ex. 2009 Spindler Decl. at ¶ 21 and Ex. 2022, Reddy at p. 98)

66. Encompassed within the range of nucleotides 28,188 to 29,232 is the gene that encodes for fibre. (Ex. 2009 Spindler Decl. at ¶ 72).

67. Fibre is an essential structural element of PAV3. (Ex. 2009 Spindler Decl. at ¶ 72).

68. The splice acceptor site of the fibre gene begins at nucleotide 28910. (Ex. 2009 Spindler Decl. at ¶ 72 (*citing* Ex. 2029 at page 415, Table 2)).

69. Accordingly, some embodiments within the scope of Claim 30 are replication-defective. (Ex. 2009 Spindler Decl. at ¶ 72).

70. Johnson does not describe or enable the production of replication-defective recombinants of PAV3. (Ex. 2009 Spindler Decl. at ¶ 73).

71. A person of skill in the art would not have been able to produce replication-defective recombinants of PAV3 without undue experimentation. (Ex. 2009 Spindler Decl. at ¶ 73).

72. Claim 26 of the '512 Johnson application is directed to a recombinant adenovirus wherein the foreign DNA is "integrated into the non-essential regions of the porcine adenovirus genome." (Ex. 2009 Spindler Decl. at ¶ 74 (*citing* Ex. 2002)).

73. The '512 application does not show which regions of PAV3 are non-essential and which are essential. (Ex. 2009 Spindler Decl. at ¶ 74).

74. In August 1997, it was not known which regions of PAV3 would prove to be essential for viral replication. (Ex. 2009 Spindler Decl. at ¶ 74).

75. The question of which regions of PAV3 will prove to be essential for viral replication is still under active investigation in the art. (Ex. 2009 Spindler Decl. at ¶ 74).

76. It is not possible to predict with confidence which regions of PAV3 are non-essential based on an understanding of other PAV serotypes or of non-porcine adenoviruses, because homology between PAV3 and other PAV serotypes is not sufficient to identify essential PAV3 regions based information that may be available regarding other PAV serotypes. (Ex. 2009 Spindler Decl. at ¶ 74).

77. Without knowledge which regions of PAV3 are non-essential, it is impossible for a person of ordinary skill in the art to practice the full scope of claim 26. (Ex. 2009 Spindler Decl. at ¶ 74).

78. Johnson first added map-unit limitations to his claims in an amendment dated February 27, 2004, in which he purported to limit his claims to the right hand end of the genome "from about 50 genomic map units to 100 genomic map units." (Ex. 2033 at page 2).

79. He argued that support was found in the disclosure of insertions of foreign genes into the "right hand end of the genome." (Ex. 2033 at page 7).

80. The specification makes clear, however, that the term "right hand end of the genome" in Johnson's disclosure refers only to map units 97-99.5, not the entire right half of the genome from map units 50 to 100. (Ex. 2002 at 13, lines 5-8 and 17-21).

81. The art relevant to the technology at issue in this interference is the preparation of animal adenovirus-based vectors for administration to mammals. (Ex. 2009 Spindler Decl. at ¶ 9).

82. A person having ordinary skill in this art in 1996-1999 would have had at least a Master's degree in the biological sciences and/or a Bachelor's degree with at least two years of experience in adenoviruses and have been familiar with scientific and technical publications concerning animal adenoviruses and in particular, porcine adenoviruses. (Ex. 2009 Spindler Decl. at ¶ 9).

83. Using 34,094 bp as the genome size, map units 81 to 84 corresponds to nucleotides 27,616 to 28,639. ((Ex. 2009 Spindler Decl. at ¶ 41)).

84. Using 35 kb as the genome size, map units 81 to 84 corresponds to nucleotides 28,350 to 29,400. ((Ex. 2009 Spindler Decl. at ¶)).

85. In some cases, the genes that are disrupted may be essential to the formation of the adenovirus rendering the resulting vector "replication-defective." (Ex. 2009 Spindler Decl. at ¶ 22)

86. In such cases, the adenovirus recombinant cannot form except in the presence of a "helper" cell that is designed to supply the missing protein or proteins that are associated with the disabled gene or genes. (see Ex. 2016, Marshall S. Horwitz, Ch. 68: Adenoviruses, FIELDS VIROLOGY B. N. Fields B.N. et al. eds. Lippincott – Raven Publishers, Philadelphia, 2149-2171, at 2165-2166 (1996); Ex. 2009 Spindler Decl. at ¶ 22).

87. Human adenoviral vectors with insertions in the essential region E1 are produced in complementing cell lines such as the human embryonic kidney "293" cell line, which expresses E1 proteins. (Ex. 2017 F. L. Graham, et al., Characteristics Of A Human Cell Line Transformed By DNA From Human Adenovirus Type 5, JOURNAL OF GENERAL VIROLOGY 36, 59-72 (1977); see Ex. 2016, Horwitz, supra at 2166, right column; Ex. 2009 Spindler Decl. at ¶ 23)

88. The Reddy patent-in-interference (the '343 patent) discloses "helper-dependent" recombinant adenovirus vectors grown in helper cell lines. (Ex. 2001 the '343 patent, col. 22 line 46 – col. 23, line 16)

89. By experimentation it is sometimes possible to identify certain areas of the adenovirus genome that are not essential to viral replication. (Ex. 2009 Spindler Decl. at ¶ 24)

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I hereby certify that the foregoing document **REDDY SUBSTANTIVE MOTION 2 (Motion under 37 CFR § 41.121(a)(I)(iii) for judgment based on unpatentability of all involved johnson claims for failure to comply with 35 U.S.C. § 112, paragraph 1)** is being deposited on this **24th day of February 2006**, with the United States Postal Service as "Express Mail Post Office to Addressee" service under 37 C.F.R. § 41.106(d) addressed to:

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Alexandria, Virginia 22314
Telephone: (571) 272-9797
Facsimile: (571) 273-0042

Date: February 24, 2006

By: _____

Evelyne Guillouet

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I hereby certify that a copy of the foregoing **REDDY SUBSTANTIVE MOTION 2 (Motion under 37 CFR § 41.121(a)(I)(iii) for judgment based on unpatentability of all involved Johnson claims for failure to comply with 35 U.S.C. § 112, paragraph 1)** is being deposited on this **24nd day of February 2006**, with the United States Postal Service as "Express Mail Post Office to Addressee" service under 37 C.F.R. § 41.106(d) addressed to:

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PATENT INTERFERENCE
Atty. Docket No. 30850/10000

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

(Administrative Patent Judge Michael P. Tierney)

POLICE S. **REDDY**, SURESH K. TIKOO and LORNE A. BABIUK
Junior Party
U.S. Patent No. 6,492,343

v.

MICHAEL A. JOHNSON, JEFFREY M. HAMMOND, RICHARD J. MCCOY and MICHAEL G. SHEPPARD
Senior Party
U.S. Application Serial No. 09/485,512

Patent Interference No. 105,358
(Technology Center 1600)

JOHNSON RESPONSIVE MOTION A PURSUANT TO 37 C.F.R. §41.121(a)(2) TO AMEND THE CLAIMS OF JOHNSON APPLICATION NO. 09/485,512 AND TO REDEFINE THE INTERFERING SUBJECT MATTER

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JOHNSON RESPONSIVE MOTION 1 PURSUANT TO 37 C.F.R. §41.121(a)(2) TO AMEND THE CLAIMS OF JOHNSON APPLICATION NO. 09/485,512 AND TO REDEFINE THE INTERFERING SUBJECT MATTER

I. RELIEF REQUESTED

Reddy Substantive Motions 2 and 3 purport to address "threshold" issues under 37 C.F.R. §41.208(a)(1) as to whether any of Johnson's allowed claims designated as corresponding to the Counts are patentable. Motion 2 asserts that all of those claims lack written descriptive support and enablement, while Motion 3 asserts that all of these claims are fatally indefinite.

This responsive motion seeks entry of an amendment in the form attached hereto as Appendix A, narrowing Johnson's designated claims 1, 4, 28, 30-31, 39, 44-50, 57-62, 70, 72, 73 and canceling designated claims 2, 26, 63-69 such that at least some of the written description/enablement grounds alleged for unpatentability in Reddy Motion 2 are mooted or "cured" and all grounds alleged for unpatentability in Reddy Motion 3 based on indefiniteness are likewise mooted or "cured." Briefly put, the requested narrowing amendments and cancellations preserve patentability of the claims and Counts incorporating them, but eliminate all references to PAV3 genome "map units" except for one reference ("map units 97-99.5") which is separately defined in the Johnson '512 specification by reference to the DNA sequence in Figure 4. The requested amendments also eliminate use of the term, "from about...to about" in any claim.

Because Johnson claim 30 is one alternative of Count 1 and Johnson claim 28 corresponds exactly to Count 2, amendment of these claims would effectively operate to redefine the interfering subject matter. Likewise cancellation of certain Johnson claims nominally gives

rise to a need for redefinition in terms of designation of Johnson claims corresponding to the Counts.

Thus, in addition to seeking amendment and cancellation of designated claims, Johnson seeks redefinition in terms of: (1) having Count 1 refer in the alternative to amended Johnson claim 30 and having Count 2 refer to amended Johnson claim 28; and (2) having Johnson claims 1, 4, 30-32, 44-50, 57-62, 70, 72 and 73 designated as corresponding to Count 1 and Johnson claims 1, 4, 28, 31-32, 44-50, 57-62, and 71-73 designated as corresponding to Count 2. Reddy claim 21 would remain an alternative of Count 1 and the existing designation of Reddy claims as corresponding to the respective Counts would be undisturbed.

Proposed changes to the Counts and to claim designations are set out in the draft Redeclaration Order attached hereto as Appendix B.

II. MATERIAL FACTS

Appendix C hereto list documentary evidence cited in the following Material Facts.

1. Johnson's involved U.S. Application No. 09/485,512 (the "'512" application) is the U.S. National phase application of PCT/AU98/00648. The claims of the '512 application as filed were the claims of PCT/AU98/00648 [Reddy Exhibit 2002].

2. U.S. Patent application 09/485,512 entered U.S. National Phase on February 10, 2000.

3. Claims 1, 2, 26, 27, 28 29 and 30 of the Johnson application as originally filed [Reddy Exhibit 2002, pages 22-26] were:

> 1. A recombinant porcine adenovirus capable of expressing DNA of interest, said DNA of interest being stably

integrated into an appropriate site of said recombinant porcine adenovirus genome.

2. A recombinant vector including a recombinant porcine adenovirus stably incorporating, and capable of expressing heterologous DNA.

26. A recombinant vector as claimed in any one of claims 2 to 25 wherein DNA of interest is stably integrated into the non-essential regions of the porcine adenovirus genome.

27. A recombinant vector as claimed in any one of claims 2 to 26 wherein DNA of interest is stably integrated into the right hand end of the genome.

28. A recombinant vector as claimed in claim 27 wherein DNA of interest is stably integrated into the right hand end of the genome at map units 97 to 99.5.

29. A recombinant vector as claimed in any one of claims 2 to 26 wherein DNA of interest is stably integrated into the E3 region of the genome.

30. A recombinant vector as claimed claim 29 wherein DNA of interest is stably integrated into the E3 region of the genome at map units 81-84.

4. The '512 specification states "Non-essential regions of the viral genome which may be suitable for the purposes of replacement with or insertion of heterologous nucleotide sequences may be non-coding regions at the right terminal end of the genome at map units 97 to 99.5. Preferred non-coding regions include the early region (E3) of the PAV genome at map units 81-84." [Reddy Exhibit 2002 at page 5, lines 18-21]. The specification further states "The E3 region of the genome, this also being a non-essential area, has been located and cloned." [*Id* at page 11, lines 32-33].

5. The nucleotide sequence of the PAV3 E3 region was published in 1995 [Reddy Exhibit 2022].

6. The '512 specification twice addresses insertion of a gene into "the *SmaI* site of the right hand end (MU 97-99.5) of porcine adenovirus serotype 3..." [Reddy Exhibit 2002, page 12 lines 21-22 and page 13 lines 20-21]. Nucleotides corresponding to the right hand end of the PAV3 genome are set out in Figure 4 of the '512 specification along with restriction endonuclease sites of interest for insertion of foreign DNA, including the *SmaI* site where insertion was actually made in the working examples. [Reddy Exhibit 2002, Figure 4; page 12 lines 24-31].

7. In an Office Action dated August 27, 2003, the Examiner entered a rejection of the claims under 35 U.S.C. §112, first paragraph, for both lack of written description and for lack of enablement. In the rejection of the claims for lack of written description, the Examiner noted that "The specification has shown the insertion of heterologous sequences into the right hand

region or the E3 region of PAV3." [Johnson Exhibit 1002, Office Action dated August 27, 2003 at page 3].

8. In an amendment filed February 27, 2004, [Reddy Exhibit 2033] claims 1, 2, 28 and 30 were amended as follows:

1. A recombinant porcine adenovirus capable of expressing heterologous DNA, said DNA of interest being stably integrated into an appropriate site of said recombinant porcine adenovirus genome wherein said site comprises a right hand end of said genome and wherein said right hadn end comprises from about 50 genomic map units to about 100 genomic map units.

2. A recombinant vector including a recombinant porcine adenovirus stably incorporating, and capable of expressing heterologous DNA wherein said heterologous DNA is incorporated in a right hand end of said recombinant porcine adenovirus genome and wherein said right hand end comprises from about 50 genomic map units to about 100 genomic map units.

28. A recombinant vector as claimed in claim 27 wherein DNA of interest is stably integrated into the right hand end of the genome at map units from about 97 to about 99.5.

30. A recombinant vector as claimed claim 29 wherein DNA of interest is stably integrated into the E3 region of the genome at map units ~~81-84~~ from about 81 to about 84.

9. To provide a showing that person skilled in the art was aware of map unit locations within the map unit regions of 50 to 100 of PAV3, Johnson introduced the "Second Declaration of Dr. Hammond." [Reddy Exhibit 2033].

10. In his declaration, Dr. Hammond stated that the nucleotide sequence that encodes the hexon protein of PAV3 was published in 1996 by McCoy et al. [*DNA Seq.* 1996:6(4):251-4, Reddy Exhibit 2027]. Dr. Hammond declared that "the hexon protein corresponds to approximately 55 to 65 map units." [Reddy Exhibit 2033, at page 3].

11. Dr. Hammond also stated that the sequence of the late region (L5) of the PAV3 genome was published in 1997 by McCoy et al. [*DNA Seq.* 1997:8(1-2)59-61, Reddy Exhibit 2028], and that this sequence corresponds to map units 72 to 85. [Reddy Exhibit 2033, at page 3].

12. Dr. Hammond referred to McCoy et al. [*DNA Seq.* 1996 6(4)251-4, Reddy Exhibit 2027], as showing the sequence information for the late region (L3) of the PAV3 genome and its correspondence to map units 50 to 55. [Reddy Exhibit 2033, at page 4].

13. In an Office Action dated May 17, 2004 [Johnson Exhibit 1003], the Examiner maintained the outstanding written description rejection and stated that "The declaration indicates that only some of the PAV3 gene sequences were available were those PAV3

sequences spanning mapping units 50-55, 55-65 and 72-85 and those sequences disclosed by applicant." [*Id*, at page 2].

14. The Examiner noted that "There is a requirement for structural knowledge regarding the insertion points in the porcine adenoviral vector, the instant invention does not provide a sufficient written description for insertion into regions other than the E3 [map units 81-84 of PAV3] or the *rhe* [map units 97-99.5 of PAV3] right hand genome region or for the use of another promoter cassette." [Johnson Exhibit 1003, at page 4].

15. In response, the applicants amended the claims to add a Markush group of map unit references to the claims [Reddy Exhibit 2032]. The amendment to claim 1, which is exemplary of the amendment made to all the independent claims, was as follows:

> 1. A recombinant porcine adenovirus capable of expressing heterologous DNA, said DNA of interest being stably integrated into an appropriate site of said recombinant porcine adenovirus genome ~~wherein said site comprises a right hand end of said genome and wherein said right hadn end comprises from about 50 genomic map units to about 100 genomic map units~~ wherein said site is selected from the group consisting of one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84 and 97-99.5 of PAV3.

16. With the entry of the amendment discussed in Fact ¶15, the Examiner indicated that "claims 1, 2, 4, 26, 28, 30-32, 39, 40, 42-44, 51, 63-73 are allowable. However due to a potential interference, *ex parte* prosecution is SUSPENDED." [Johnson Exhibit 1004, Communication from Examiner dated October 7, 2004, at page 2].

17. The sequence of the entire PAV3 genome was published in 1998 [Reddy Exhibit 2029].

18. A two-count Interference No. 105,358 was declared between Johnson's '512 application and Reddy U.S. Patent No. 6,492,343.

19. Count 1 in Patent Interference No. 105,358 is directed to "A vector according to Claim 30 of U.S. Application 09/485,512 or Claim 21 of U.S. Patent No. 6,492,343." Johnson's Claims 1, 2, 4,26, 30-32, 44-62, 65, 66, 69-70, 72, and 73 were designated in the declaration of the interference as corresponding to Count 1.

20. Count 2 in Patent Interference No. 105,358 is directed to "A vector according to Claim 28 of U.S. Application 09/485,512." Johnson's Claims 1, 2, 4,26, 31-32, 44-62, 71-73 were designated in the declaration of the interference as corresponding to Count 2.

21. Johnson claims 39, 40, 42, 63, 64, and 67-68 were identified in the declaration of the interference as claims which do not correspond to either Count 1 or Count 2.

22. Pursuant to an Order redeclaring the interference issued on January 24, 2006, Reddy's claims 13-14, 16-19, 21-28, 30-40 and 43-44 have been designated as corresponding to Count 1; and Reddy's claims 13-14, 16-19, 22-28, 31-40 and 43-44 have been designated as corresponding to the Count 2 [Paper 24].

23. Reddy filed three preliminary motions as follows:

a. Reddy Substantive Motion 1 (to change the benefit accorded to Johnson for the contested subject matters of Count 1);

b. Reddy Substantive Motion 2 (for judgment based on unpatentability of all involved Johnson Claims for Failure to comply with 35 U.S.C. §112, ¶1); and

c. Reddy Substantive Motion 3 (for judgment on grounds of indefiniteness 35 U.S.C. §112, ¶2).

24. In Section C of Reddy Substantive Motion 2, Reddy refers to Claims 1-2, 4, 26, 31, 39-40, 42, 44-65, 67, 68-69 and 72-73 and alleges that the '512 application does not describe or enable recombinant adenoviruses with an insertion made in a site consisting of one or more of "MU 50-55, 55-65, or 72-85" of PAV3. Reddy argues that, "Map units 50-55, 55-65, 72-85 are not mentioned or otherwise described anywhere in the '512 specification" [Reddy Substantive Motion 2, at page 5] and that as such "the '512 application fails to describe claims directed to insertions into map units 50-55, 55-65 and 72-85 of PAV3." [Reddy Substantive Motion 2, at page 6]. Reddy further asserts that the "'512 application fails to enable the above-listed claims" [*Id*].

25. In its substantive Motion 3, Reddy asserted that "Johnson's claims suffer from a fatal flaw: they are all refer to "map unit" ranges that are ambiguous at best, given the specification's contradictory guidance as to the size of the PAV3 genome." [Reddy Substantive

Motion 3 at page 11]. Reddy Substantive Motion 3 also objects to the use of the term "from about . . . to about" in claims 28 and 30 [*Id.* at page 10].

26. Reddy involved U.S. Patent No. 6,492,343 [Reddy Exhibit 2001] states at Col. 3, lines 24-32:

> The invention also provides **non-essential regions** which can be deleted to increase the capacity of a PAV vector for inserted heterologous sequences. **These include, but are not limited to, the E3 and E4 regions, and the region between E4 and the right end of the genome.** Essential regions, such as E1, can also be deleted, if virus bearing such deletions are propagated in helper cell lines supplying the deleted essential function. [Emphasis added.]

27. Reddy Substantive Motion 3 does not argue that the Johnson claim term, "non-essential region," is indefinite *per se*, only that the term as applied to the map units recited in Johnson's involved claims does not otherwise save those claims from indefiniteness based on reference to map units. [Reddy Substantive Motion 3, at page 11].

28. Claim 21 of Reddy's involved patent [Reddy Exhibit 2001] recites:

> The recombinant PAV-3 vector according to claim 13 wherein the heterologous nucleotide sequence is inserted in the E3 region.

29. Reddy Substantive Motion 3 does not argue that reference in the Johnson claims to "the E3 region" is indefinite.

30. This responsive motion is being filed in order to amend claims 1, 4, 28, 30, 31, 32, 39, 40, 42, 44-62, 70, 72, and 73 and cancel claims 2, 63, 65, 66, 67, 68, and 69. More particularly:

a. Claims 1, 31, 39, 70, 72, and 73 have been amended to remove recitation of mapping units 50-55, 55-65, 72-85. As a corollary amendment, Claims 63, 65, 66, 67, 68, and 69 have been canceled;

b. Claims 1, 31, 39, 70, 72 and 73 have been amended in order to remove recitation of mapping units 81-84 and to insert the term "the E3 region" therefore;

c. Johnson claims 28 and 30 are re-written in independent format by incorporating the applicable limitations of claim 2. As a corollary amendment, claim 2 has been canceled, and claims 4, 32, 44-62 have been amended to correct the antecedent basis of those claims so that the claims now depend from claim 28 or claim 30 as opposed to canceled claim 2;

d. Claim 26 has been cancelled and the limitations of claim 26 have been incorporated into amended claims 28 and 30; and

e. Claims 32, 40, 42 and 51-56 and 71 are as previously presented.

31. The amendments to the claims summarized in ¶30, are presented in the accompanying amendment and are reproduced below with the proposed amendments highlighted by bold-face underlining and strikouts:

1. **[currently amended]** A recombinant porcine adenovirus expressing heterologous DNA, said DNA of interest being stably

integrated into a site of said recombinant porcine adenovirus genome wherein said site is **a non-essential region of a site** selected from the group consisting ~~of one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84~~, **the E3 region** and **map units** 97-99.5 of PAV3.

2. **[cancelled]** A recombinant vector including a recombinant porcine adenovirus stably incorporating, and expressing heterologous DNA wherein said heterologous DNA is incorporated into a site selected from the group consisting of one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84, and 97-99.5 of PAV3.

4. **[currently amended]** A recombinant vector as claimed in ~~claim 3~~ **claim 28 or claim 30** wherein said recombinant porcine adenovirus includes a live porcine adenovirus having virion structural proteins unchanged from those in a native porcine adenovirus from which said recombinant porcine adenovirus is derived.

26. **[cancelled]** A recombinant vector as claimed in claim 2 wherein said heterologous DNA is stably integrated into the non-essential regions of the porcine adenovirus genome.

28. [currently amended] A recombinant vector ~~as claimed in claim 2~~ **including a recombinant porcine adenovirus stably incorporating, and expressing heterologous DNA** wherein said heterologous DNA is stably integrated into **a non-essential region of** the right hand end of the genome at map units from ~~about~~ 97 to ~~about~~ 99.5.

30. [currently amended] A recombinant vector ~~as claimed in claim 2~~ **including a recombinant porcine adenovirus stably incorporating, and expressing heterologous DNA** wherein said heterologous DNA is stably integrated into **a non-essential region of** the adenovirus E3 region of the genome ~~at map units from about 81 to about 84~~.

31. [currently amended] A method of producing a recombinant porcine adenovirus vector for use as a vaccine including inserting into a non-essential region of a porcine adenovirus genome, at least one heterologous nucleotide sequence in association with an effective promoter sequence wherein said heterologous nucleotide sequence is inserted into a site selected from the group consisting of ~~one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84,~~ **the E3 region** and **map units** 97-99.5 of PAV3.

32. [previously presented] A method as claimed in claim 31 wherein prior to insertion of said heterologous nucleotide sequence, a restriction enzyme site is inserted into said non-essential region of said porcine adenovirus genome.

39. [currently amended] A method of vaccination of pigs against disease including administering to said pigs a first recombinant porcine adenovirus vector stably incorporating, and expressing a heterologous nucleotide sequence encoding at least one antigenic determinant of said disease against which vaccination is desired, wherein said heterologous nucleotide sequence is inserted into a site selected from the group consisting of ~~one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84,~~ the E3 region and map units 97-99.5 of PAV3.

40. [previously presented]A method as claimed in claim 39 including administering to said pig a second porcine adenovirus vector including at least one heterologous nucleotide sequence which differs from a heterologous nucleotide sequence incorporated in said first recombinant porcine adenovirus vector.

42. [previously presented]A method as claimed in claim 40 wherein said second porcine adenovirus vector incorporates, and is

expressing at least one heterologous nucleotide sequence encoding an immuno-potentiating molecule.

44. **[currently amended]** A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes an antigenic polypeptide.

45. **[currently amended]** A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes an immuno-potentiating molecule.

46. **[currently amended]** A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes antigenic determinants of infectious agents causing intestinal diseases in pigs.

47. **[currently amended]** A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes antigenic determinants of infectious agents causing respiratory diseases in pigs.

48. **[currently amended]** A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes an antigenic determinant of pseudorabies virus (Aujeszky's disease virus).

49. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes an antigenic determinant of glycoprotein D of pseudorabies virus.

50. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes an antigenic determinant of porcine respiratory and reproductive syndrome virus (PRRSV).

51. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of Hog cholera virus.

52. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of porcine parvovirus.

53. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of porcine coronavirus.

54. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of porcine rotavirus.

55. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of porcine parainfluenza virus.

56. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of Mycoplasma hyopneumonia.

57. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes FMS-like tyrosine kinase 3 (FLT-3) ligand.

58. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes interleukin-3 (IL-3).

59. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes porcine interleukin-4 (IL-4).

60. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes gamma interferon.

61. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous

nucleotide sequence encodes porcine granulocyte macrophage colony stimulating factor (GM-CSF).

62. **[currently amended]** A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes porcine granulocyte colony stimulating factor (G-CSF).

63. **[cancelled]** A recombinant vector of any of claims 1 or 2, wherein said heterologous DNA is incorporated into a PAV3 genome region spanning mapping units 50-55 of PAV3.

64. **[cancelled]** A recombinant vector of any of claims 1 or 2, wherein said heterologous DNA is incorporated into a PAV3 genome region spanning mapping units 55-65 of PAV3.

65. **[cancelled]** A recombinant vector of any of claims 1 or 2, wherein said heterologous DNA is incorporated into a PAV3 genome region spanning mapping units 72-85 of PAV3.

66. **[cancelled]** A recombinant vector of any of claims 1 or 2, wherein said heterologous DNA is incorporated into a genome region spanning mapping units 81-84 of PAV3.

67. **[cancelled]** A method as claimed in any of claims 31 or 39, wherein said heterologous nucleotide sequence is incorporated into a PAV3 genome region spanning mapping units 50-55 of PAV3.

68. **[cancelled]** A method as claimed in any of claims 31 or 39, wherein said heterologous nucleotide sequence is incorporated into a PAV3 genome region spanning mapping units 55-65 of PAV3.

69. **[cancelled]** A method as claimed in any of claims 31 or 39, wherein said heterologous nucleotide sequence is incorporated into a PAV3 genome region spanning mapping units 72-85 of PAV3.

70. **[currently amended]** A method as claimed in any of claims 31 or 39, wherein said heterologous nucleotide sequence is incorporated into ~~a~~ the E3 region of the PAV3 genome ~~region spanning mapping units 81-84 of PAV3~~.

71. [previously presented] A method as claimed in any of claims 31 or 39, wherein said heterologous nucleotide sequence is incorporated into a PAV3 genome region spanning mapping units 97-99.5 of PAV3.

72. **[currently amended]** A recombinant porcine adenovirus expressing heterologous DNA, said DNA of interest being stably integrated into a site of said recombinant porcine adenovirus genome wherein said site is a non-essential region of a site selected from the group consisting of ~~one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84~~, the E3 region and map units 97-99.5 of PAV3 wherein said recombinant porcine

adenovirus comprises the major late promoter and tripartite leader elements of PAV3.

73. **[currently amended]** A recombinant vector including a recombinant porcine adenovirus stably incorporating, and expressing heterologous DNA wherein said heterologous DNA is incorporated into a **non-essential region of a** site selected from the group consisting of ~~one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84,~~ **the E3 region** and **map units** 97-99.5 of PAV3 wherein said recombinant porcine adenovirus comprises the major late promoter and tripartite leader elements of PAV3.

III. REASONS WHY RELIEF SHOULD BE GRANTED

Pursuant to 37 C.F.R. §41.208(b), Johnson provides the following remarks in support of its motion to amend certain of its claims. The accompanying amendments are presented pursuant to 37 C.F.R. §41.121(a)(1)(i) and are reproduced in Fact ¶31.

A. Showing Pursuant 37 C.F.R. §41.208(c)(1) as to Patentability of Amended Claims 1, 4, 28, 30-31, 39, 44-50, 57-62, 70, 72, and 73

Each of the amended adenovirus claims 1 and 72 has been amended by elimination of all reference to map units except for "map units 97-99.5" and by incorporation of reference to a "non-essential region" as a site for insertion as previously recited in cancelled claim 26. Thus they are narrower than, and define subject matter with the scope of, originally-allowed claims 1 and 72. The claims as amended are thus patentable over the art of record. No new art has been asserted against originally-allowed claims 1 and 72.

Claims 4, 44-50, and 57-62 have been amended to a multiple dependency format in view of the cancellation of claim 2. Claim 2, from which these claims previously depended was determined to be patentable over the art of record. No new art has been asserted against the originally-allowed claims 4, 44-50, and 57-62.

Vector claim 2 has been cancelled and vector claim 73 has been narrowed in scope by elimination of all reference to map units except for "map units 97-99.5" and incorporation of reference to a "non-essential region" as a site for insertion. Claim 73 is thus narrower in scope than originally-allowed claim 73. No new art has been asserted against originally allowed claim 73.

Claim 30 (formerly dependent on claim 2) has been amended to delete reference to map units, delete the term "from about . . . to about," incorporate reference to a "non-essential region" as a site for insertion, and has been re-written in independent format. It is thus narrower in scope than originally allowed claim 30. No new art has been asserted against originally allowed claim 30.

Claim 28 (formerly dependent on claim 2) has been amended to delete the term "from about . . . to about," incorporate reference to a "non-essential region" as a site for insertion, and has been re-written in independent format. It is thus narrower in scope than originally allowed claim 28. No new art has been asserted against originally allowed claim 28.

Production method claim 31 has been amended to delete reference to map units other than "map units 97-99.5." It is thus narrower in scope than originally allowed claim 31. No new art has been asserted against originally allowed claim 31.

In sum, each of the amended claims is patentable over the art. As set out in Sections C and D below, the amended claims are free of any ground for unpatentability set out in Section C of Reddy Motion 2 and free of all grounds of unpatentability set out in Reddy Motion 3.

B. Showing Pursuant to 37 C.F.R. §41.208(c)(2) as to Patentability of the Amended Count over the Prior Art

Count 1 currently refers to claim 30 in non-amended form as one of its alternatives. As shown above, claim 30 in amended form is patentable over the art and a Count incorporating claim 30 in its amended form would likewise be patentable over the prior art.

Count 2 currently refers to claim 28. As shown above, claim 28 in amended form is patentable over the art and a Count incorporating claim 28 in its amended form would likewise be patentable over the prior art.

C. Amendment to Delete Reference to Map Units 50-55, 55-65 and 72-85 Moots Arguments Raised in Section C of Reddy Substantive Motion 2

Section C of Reddy Substantive Motion 2 spans pages 5 through 7 attacks patentability of Johnson's claims 1-2, 4, 26, 31, 39-40, 42, 44-65, 67, 68-69 and 72-73 based exclusively on their reference to "MU 50-55, 55-65 or 72-85." These map unit references were incorporated into the claims by amendment following the Examiner's assessment that the PAV3 gene sequences corresponding to those map units were available to those skilled in the art. (Fact ¶¶9-13 and Fact ¶24)

Following the amendments requested herein, no such map unit references appear in any Johnson claim. As such, arguments in Section C of Reddy's Substantive Motion 2 based on reference to "MU 50-55, 55-65 or 72-85" are mooted.

D. The Requested Amendments Render Reddy's Substantive Motion 3 Moot with Respect to Alleged Indefiniteness of Johnson's Claims

Reddy's arguments in Substantive Motion 3 are based on entirely on recitation of map units in the Johnson claims, and the use of the term "from about . . . to about" in claims 28 and 30. (Fact ¶¶ 25,29)[1] . Each of these arguments is rendered moot by the requested amendments.

1. Reddy's arguments relating to map units are rendered moot due to deletion of map units 50-55, 55-65, 72-85 and 81-84 from the claims and the fact that the DNA sequence of 97-99.5 is explicitly defined in Figure 4 of the '512 specification

In its Substantive Motion 3, Reddy argues that the Johnson claims are fatally flawed (Fact ¶ 25) because at the time the present application was filed the skilled person would not have known which sequences of the PAV3 genome corresponded to the map units recited in the claims of the '512 application [Reddy Motion 3, pages 6-9]. Upon entry of the requested amendments, only designated claims 28, 31, 71, 72 and 73 contain any reference to map units in the PAV3 genome identifying sites for DNA insertion. This reference is to "map units 97-99.5" which is independent of any consideration of genome size and is entirely defined in the '512 specification. More particularly, the right hand end of the PAV3 genome is defined in the specification as constituting "MU 97-99.5" and its DNA sequence is shown in Figure 4 which includes restriction endonuclease cleavage sites for DNA insertion such as the *SmaI* site used in

[1] See Fact ¶¶ 26 and 27 regarding the term, "non-essential region.".

the working examples. (Facts ¶ 4, 6). Claims 28, 31, 71, 72 and 73 are thus definite in their recitation of "map units 97-99.5" when viewed in light of the specification.

Designated claims 30, 31, 72 and 73 have been amended to remove recitation of map units 81-84 so as to refer only to "the E3 region." This term is used in the Reddy involved patent specification (Fact ¶ 26) and claims (Fact ¶ 28) to characterize a DNA sequence published in 1995 (Fact ¶ 5). It is not asserted by Reddy to render the Johnson claims indefinite. (Facts ¶ 29).

2. Reddy's arguments relating to the use of the term "from about ... to about" are rendered moot due to deletion of that term from claims 28 and 30

At page 10 of its Substantive Motion 3, Reddy objects to use of the term "from about . . .to about" in claims 28 and 30. (Fact ¶25). The requested amendment of claims 28 and 30 deletes the questioned term, thereby rendering moot Reddy's objections.

As established in Sections D(1) and (2) above, the requested amendments render Reddy Substantive Motion 3 moot on the issue of alleged indefiniteness of Johnson's designated claims.

IV. CONCLUSION

Grant of this responsive motion and entry of the requested amendment eliminates all the asserted "threshold" patentability issues raised by Reddy in its Substantive Motion 3 and eliminates the asserted "threshold" patentability issues raised by Reddy in Section C of its Substantive Motion 2. This responsive motion should therefore be granted.

March 28, 2006

Respectfully submitted,

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Johnson Responsive Motion 1
Appendix A

PATENT INTERFERENCE
Filed on behalf of: Senior Party Johnson Atty. Docket No. 30850/10000

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Paper No. ____

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

(Administrative Patent Judge Michael P. Tierney)

POLICE S. **REDDY**, SURESH K. TIKOO and LORNE A. BABIUK
Junior Party
U.S. Patent No. 6,492,343

v.

MICHAEL A. **JOHNSON**, JEFFREY M. HAMMOND, RICHARD J. MCCOY and MICHAEL G. SHEPPARD
Senior Party
U.S. Application Serial No. 09/485,512

Patent Interference No. 105,358
(Technology Center 1600)

JOHNSON FIRST INTERFERENCE AMENDMENT TO JOHNSON APPLICATION NO. 09/485,512

JOHNSON FIRST INTERFERENCE AMENDMENT TO JOHNSON APPLICATION NO. 09/485,512

In conjunction with concurrently-filed Johnson Responsive Motion 1 pursuant to 37 C.F.R. §41.121(a)(2), Senior Party Johnson files this motion to amend the claims of Johnson Application U.S. Serial No. 09/485,512 as follows:

Amendment to Claims

In accordance with 37 C.F.R. §1.121 the following is a complete listing of the claims of 09/485,512, noting all amendment made herein as well as the status of the claims and replaces all other claims of the aforementioned application. The amendments are highlighted in bold:

1. **[currently amended]** A recombinant porcine adenovirus expressing heterologous DNA, said DNA of interest being stably integrated into a site of said recombinant porcine adenovirus genome wherein said site is **a non-essential region of a site** selected from the group consisting ~~**of one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84**~~, **the E3 region** and **map units** 97-99.5 of PAV3.

2. **[cancelled]** A recombinant vector including a recombinant porcine adenovirus stably incorporating, and expressing heterologous DNA wherein said heterologous DNA is incorporated into a

site selected from the group consisting of one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84, and 97-99.5 of PAV3.

4. **[currently amended]** A recombinant vector as claimed in ~~claim 2~~ **claim 28 or claim 30** wherein said recombinant porcine adenovirus includes a live porcine adenovirus having virion structural proteins unchanged from those in a native porcine adenovirus from which said recombinant porcine adenovirus is derived.

26. **[cancelled]** A recombinant vector as claimed in claim 2 wherein said heterologous DNA is stably integrated into the non-essential regions of the porcine adenovirus genome.

28. **[currently amended]** A recombinant vector ~~as claimed in claim 2~~ **including a recombinant porcine adenovirus stably incorporating, and expressing heterologous DNA** wherein said heterologous DNA is stably integrated into **a non-essential region of** the right hand end of the genome at map units from ~~about~~ 97 to ~~about~~ 99.5.

30. **[currently amended]** A recombinant vector ~~as claimed in claim 2~~ **including a recombinant porcine adenovirus stably incorporating, and expressing heterologous DNA** wherein said heterologous DNA is stably integrated into **a non-essential region of** the

adenovirus E3 region of the genome ~~at map units from about 81 to about 84~~.

31. **[currently amended]** A method of producing a recombinant porcine adenovirus vector for use as a vaccine including inserting into a non-essential region of a porcine adenovirus genome, at least one heterologous nucleotide sequence in association with an effective promoter sequence wherein said heterologous nucleotide sequence is inserted into a site selected from the group consisting of ~~one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84,~~ the E3 region and map units 97-99.5 of PAV3.

32. [previously presented] A method as claimed in claim 31 wherein prior to insertion of said heterologous nucleotide sequence, a restriction enzyme site is inserted into said non-essential region of said porcine adenovirus genome.

39. **[currently amended]** A method of vaccination of pigs against disease including administering to said pigs a first recombinant porcine adenovirus vector stably incorporating, and expressing a heterologous nucleotide sequence encoding at least one antigenic determinant of said disease against which vaccination is desired, wherein said heterologous nucleotide sequence is inserted into a site

selected from the group consisting of ~~one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84,~~ the E3 region and map units 97-99.5 of PAV3.

40. [previously presented]A method as claimed in claim 39 including administering to said pig a second porcine adenovirus vector including at least one heterologous nucleotide sequence which differs from a heterologous nucleotide sequence incorporated in said first recombinant porcine adenovirus vector.

42. [previously presented]A method as claimed in claim 40 wherein said second porcine adenovirus vector incorporates, and is expressing at least one heterologous nucleotide sequence encoding an immuno-potentiating molecule.

44. **[currently amended]** A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes an antigenic polypeptide.

45. **[currently amended]** A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes an immuno-potentiating molecule.

46. **[currently amended]** A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous

nucleotide sequence encodes antigenic determinants of infectious agents causing intestinal diseases in pigs.

47. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes antigenic determinants of infectious agents causing respiratory diseases in pigs.

48. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes an antigenic determinant of pseudorabies virus (Aujeszky's disease virus).

49. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes an antigenic determinant of glycoprotein D of pseudorabies virus.

50. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes an antigenic determinant of porcine respiratory and reproductive syndrome virus (PRRSV).

51. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of Hog cholera virus.

52. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of porcine parvovirus.

53. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of porcine coronavirus.

54. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of porcine rotavirus.

55. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of porcine parainfluenza virus.

56. [previously presented] A recombinant vector as claimed in claim 44 wherein said heterologous nucleotide sequence encodes an antigenic determinant of Mycoplasma hyopneumonia.

57. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes FMS-like tyrosine kinase 3 (FLT-3) ligand.

58. [currently amended] A recombinant vector as claimed in ~~claim 2~~ claim 28 or claim 30 wherein said heterologous nucleotide sequence encodes interleukin-3 (IL-3).

59. **[currently amended]** A recombinant vector as claimed in ~~**claim 2**~~ **claim 28 or claim 30** wherein said heterologous nucleotide sequence encodes porcine interleukin-4 (IL-4).

60. **[currently amended]** A recombinant vector as claimed in ~~**claim 2**~~ **claim 28 or claim 30** wherein said heterologous nucleotide sequence encodes gamma interferon.

61. **[currently amended]** A recombinant vector as claimed in ~~**claim 2**~~ **claim 28 or claim 30** wherein said heterologous nucleotide sequence encodes porcine granulocyte macrophage colony stimulating factor (GM-CSF).

62. **[currently amended]** A recombinant vector as claimed in ~~**claim 2**~~ **claim 28 or claim 30** wherein said heterologous nucleotide sequence encodes porcine granulocyte colony stimulating factor (G-CSF).

63. **[cancelled]** A recombinant vector of any of claims 1 or 2, wherein said heterologous DNA is incorporated into a PAV3 genome region spanning mapping units 50-55 of PAV3.

64. **[cancelled]** A recombinant vector of any of claims 1 or 2, wherein said heterologous DNA is incorporated into a PAV3 genome region spanning mapping units 55-65 of PAV3.

65. **[cancelled]** A recombinant vector of any of claims 1 or 2, wherein said heterologous DNA is incorporated into a PAV3 genome region spanning mapping units 72-85 of PAV3.

66. **[cancelled]** A recombinant vector of any of claims 1 or 2, wherein said heterologous DNA is incorporated into a genome region spanning mapping units 81-84 of PAV3.

67. **[cancelled]** A method as claimed in any of claims 31 or 39, wherein said heterologous nucleotide sequence is incorporated into a PAV3 genome region spanning mapping units 50-55 of PAV3.

68. **[cancelled]** A method as claimed in any of claims 31 or 39, wherein said heterologous nucleotide sequence is incorporated into a PAV3 genome region spanning mapping units 55-65 of PAV3.

69. **[cancelled]** A method as claimed in any of claims 31 or 39, wherein said heterologous nucleotide sequence is incorporated into a PAV3 genome region spanning mapping units 72-85 of PAV3.

70. **[currently amended]** A method as claimed in any of claims 31 or 39, wherein said heterologous nucleotide sequence is incorporated into ~~a~~ **the E3 region of the** PAV3 genome ~~**region spanning mapping units 81-84 of PAV3**~~.

71. [previously presented] A method as claimed in any of claims 31 or 39, wherein said heterologous nucleotide sequence is

incorporated into a PAV3 genome region spanning mapping units 97-99.5 of PAV3.

72. [currently amended] A recombinant porcine adenovirus expressing heterologous DNA, said DNA of interest being stably integrated into a site of said recombinant porcine adenovirus genome wherein said site is a non-essential region of a site selected from the group consisting of ~~one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84~~, the E3 region and map units 97-99.5 of PAV3 wherein said recombinant porcine adenovirus comprises the major late promoter and tripartite leader elements of PAV3.

73. [currently amended] A recombinant vector including a recombinant porcine adenovirus stably incorporating, and expressing heterologous DNA wherein said heterologous DNA is incorporated into a non-essential region of a site selected from the group consisting of ~~one or more mapping units selected from the group consisting of mapping units 50-55, 55-65, 72-85, 81-84,~~ the E3 region and map units 97-99.5 of PAV3 wherein said recombinant porcine adenovirus comprises the major late promoter and tripartite leader elements of PAV3.

Remarks

Claims 1, 2, 4, 26, 28, 30-32, 39, 40, 42, 44, 51, and 63-73 are pending in the U.S. Application No. 09/485,512 and have been allowed by the Examiner. Prosecution was suspended pending completion of Patent Interference No. 105,358.

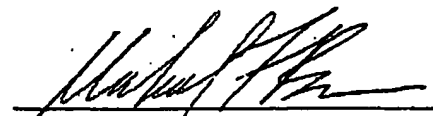
In the above amendment:

- Claims 1, 4, 28, 30, 31, 39, 44-50, 57-62, 70, 72, and 73 have been amended;
- Claims 2, 26 and 63-69 have been cancelled;
- Claims 26 has been cancelled and the limitations of claim 26 have been incorporated into amended claims 28 and 30;
- Claims 4, 44-50 and 57-62 have been amended to modify the antecedent basis of those claims so that the claims now depend from claim 28 or claim 30 as opposed to cancelled claim 2;
- Claims 51-56 and 71 are presented in the above claim list as previously allowed by the Examiner;

Applicants present the above amendments in response Reddy's Substantive Motions 2 and 3. A showing of the allowability of these amendments is presented in the accompanying Johnson Responsive Motion 1. Accordingly, Applicants request entry of the above amendments in U.S. Application No. 09/485,512 and solicit allowance of the same.

Respectfully submitted,

March 28, 2006



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Johnson Responsive Motion 1
Appendix B

Filed on behalf of: Senior Party Johnson

PATENT INTERFERENCE
Atty. Docket No. 30850/10000

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

(Administrative Patent Judge Michael P. Tierney)

POLICE S. **REDDY**, SURESH K. TIKOO and LORNE A. BABIUK
Junior Party
U.S. Patent No. 6,492,343

MICHAEL A. **JOHNSON**, JEFFREY M. HAMMOND, RICHARD J. MCCOY and MICHAEL G. SHEPPARD
Senior Party
U.S. Application Serial No. 09/485,512

Patent Interference No. 105,358
(Technology Center 1600)

REDECLARATION - Bd. R. 203(c)

Michael P. Tierney, *Administrative Patent Judge*.

The interference is redeclared solely to reflect amendments to claims 1, 4, 28, 30-31, 39, 44-50, 57-62, 70, 72 and 73 and cancellation of claims 2, 26, and 63-69 of Johnson involved

U.S. Application No. 09/485,512 reflected in Johnson First Interference Amendment to Johnson Application No. 09/485,512 dated March 28, 2006.

Reddy's claim correspondence and the parties' accorded priority benefit dates remain the same as that set forth in the Notice Declaring Interference (Paper No. 1).

Count 1

A vector according to Claim 30 of U.S. Application 09/485,512 or Claim 21 of U.S. Patent No. 6,492,343.

The claims of the parties are:

Johnson, U.S. Application 09/485,512:	1, 4-28, 30-32, 39, 40, 42, 44-62 and 70-73
Reddy, U.S. Patent No. 6,492,343:	1-44

The claims of the parties which correspond to Count 1 are:

Johnson, U.S. Application 09/485,512:	1, 4, 30-32, 44-50, 57-62, 70, 72 and 73
Reddy, U.S. Patent No. 6,492,343:	13-14, 16-19, 21-28, 30-40 and 43-44

Count 2

A vector according to Claim 28 of U.S. Application 09/485,512.

The claims of the parties which correspond to Count 2 are:

Johnson, U.S. Application 09/485,512:	1, 4, 28, 31-32, 44-50, 57-62 and 71-73
Reddy, U.S. Patent No. 6,492,343:	13-14, 16-19, 22-28, 31-40 and 43-44

The claims of the parties which do not correspond to Count 1 or Count 2, and therefore are not involved in the interference, are:

Johnson, U.S. Application 09/485,512:	39, 40 and 42
Reddy, U.S. Patent No. 6,492,343:	1-12, 15, 20, 29 and 41-42

MICHAEL P. TIERNEY
Administrative Patent Judge

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APPENDIX C
(Evidence In Support Of Johnson Responsive Motion 1)

In support of this motion, Johnson relies on Johnson Exhibit Nos. 1002, 1003, and 1004 and Reddy Exhibit Nos. 2001, 2002, 2022, 2027, 2028, 2029, 2032 and 2033.

Johnson Exhibit 1002 - Communication from Examiner dated August 27, 2003

Johnson Exhibit 1003 - Communication from Examiner dated May 17, 2004

Johnson Exhibit 1004 - Communication from Examiner dated October 7, 2004

Reddy Exhibit 2001 - U.S. Patent No. 6,492,343

Reddy Exhibit 2002 - Johnson U.S. Patent Application No. 09/485,512

Reddy Exhibit 2022 - P. Seshidar Reddy et al. *Sequence Analysis of Putative pVIII, E3 and Fibre Regions of Porcine Adenovirus Type 3*, Virus Research 36:97-106 (1995).

Reddy Exhibit 2027 - R. J. McCoy et al. *Nucleotide and Amino Acid Sequence Analysis of the Porcine Adenovirus 23K Protein*, DNA Sequence 6:251-254 (1996)

Reddy Exhibit 2028 - R. J. McCoy et al. *Nucleotide and Amino Acid Sequence Analysis Adenovirus, of the 100K Protein of a Serotype 3 Porcine*, DNA Sequence 8:59-61 (1997)

Reddy Exhibit 2029 - P. Seshidar Reddy et al. *Nucleotide Sequence and Transcription Map of Porcine Adenovirus Type 3*, Virology 251(2):414-426 (1998)

Reddy Exhibit 2032 - Response to Final Office Action dated August 13, 2004.

Reddy Exhibit 2033 - Second Declaration of Dr. Jeffrey Hammond Under 37 C.F.R. §1.132 (7 pages) with Response to Office Action dated February 27, 2004 (19 pages)

Certificate of Filing

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I hereby certify that the foregoing **JOHNSON RESPONSIVE MOTION 1 PURSUANT TO 37 C.F.R. §41.121(a)(2) TO AMEND THE CLAIMS OF JOHNSON APPLICATION NO. 09/485,512 AND TO REDEFINE THE INTERFERING SUBJECT MATTER** and any attachments referred to therein as being enclosed therewith is being deposited with the United States Postal Service "EXPRESS MAIL POST OFFICE TO ADDRESSEE" service under 37 C.F.R. § 1.10 on **March 28, 2006** and is addressed to Administrative Patent Judge Michael P. Tierney at the address indicated below:

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Telephone: (571) 272-9797
Facsimile: (571) 273-0042

Richard Zimmermann

CERTIFICATE OF SERVICE

EXPRESS MAIL LABEL NO.: EV456042373US

The undersigned hereby certifies that a true copy of **JOHNSON RESPONSIVE MOTION 1 PURSUANT TO 37 C.F.R. §41.121(a)(2) TO AMEND THE CLAIMS OF JOHNSON APPLICATION NO. 09/485,512 AND TO REDEFINE THE INTERFERING SUBJECT MATTER** and any attachments referred to therein as being enclosed therewith is being served upon Lead Counsel for Reddy et al. via the United States Postal Service "EXPRESS MAIL POST OFFICE TO ADDRESSEE" service under 37 C.F.R. § 1.10 on **March 28, 2006** to:

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Richard Zimmermann

UNITED STATES POSTAL SERVICE

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08/07/2006

FACSIMILE TRANSMISSION SHEET

TO: Craig Feinberg

(571) 273-0299

FROM: Nabeela R. McMillian

RE: Interference No. 105,358; Our Ref. 31141/10000

PAGES (INCLUDING THIS PAGE): 49

****

Dear Mr. Feinberg:

Attached please find a copy (including Appendices A-C) of "JOHNSON RESPONSIVE MOTION 1 PURSUANT TO 37 C.F.R. §41.121(A)(2) TO AMEND THE CLAIMS OF JOHNSON APPLICATION NO. 09/485,512 AND TO REDEFINE THE INTERFERING SUBJECT MATTER."

This paper was filed by Senior Party Johnson on March 28, 2006 under Express Mail Label EV456042387US as evidenced by the attached Track & Confirm Receipts from the U.S. Postal Service.

Yours sincerely,
Nabeela R. McMillian

If you do not receive all pages of this fax in good condition, please contact Angela Pretnik at (312) 474-6300.

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